A SURVEY AND DESCRIPTION OF THE NATURAL PLANT COMMUNITIES OF THE KISATCHIE NATIONAL FOREST

VERNON DISTRICT

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GENERAL DISTRICT DESCRIPTION

PRESETTLEMENT NATURAL COMMUNITIES

OVERVIEW

In the area encompassed by the Vernon District today, the predominant presettlement natural communities of the landscape included upland longleaf pine forest, longleaf pine flatwoods/flatwood savannah, mixed hardwood-loblolly forest and riparian forest. Other natural communities that are recognized today may be considered inclusions within or variants of these major types.

It is important to note that presettlement in this report refers to the period from about 1830 to 1880, not pre-European settlement (>500 years ago). The period chosen to represent presettlement was selected largely to pre-date the effects of industrial technology, particularly railroads which were the first substantial expression of the industrial revolution in rural Louisiana, and to include land surveys conducted by the General Land Office (GLO) in the mid-1800's (*e.g.*, Bradford 1980). During the specified period, very light settlement characterized most rural areas of the state and the great majority of the landscape had been unaffected by what little settlement was present.

One purpose of this report is to elucidate natural processes and patterns indigenous to the landscape of KNF during the presettlement period. The intrinsic ecological processes of the area (principally climatic and edaphic conditions as they affect plant community structure, distribution and composition) have not changed significantly from the presettlement period to the present day. What has changed is that artificial constraints now interfere with the expression of those processes on the landscape and preclude the vegetational patterns they would produce. Present-day native biodiversity is a legacy of previously dominant ecological processes and patterns which can only be properly understood within the context of the presettlement landscape and its intrinsic driving forces.

Natural Dynamics of Presettlement Communities

Before European settlement of what is now KNF, the landscape consisted of a mosaic of natural communities whose composition, structure and distribution were controlled almost

entirely by natural processes. Fire was arguably the dominant force that shaped the characteristics and distribution of the communities of the Vernon District prior to settlement.

Lightning fire has been affecting the landscape for millions of years and was the primary selective force that favored the dominance of longleaf pine and other fire-adapted species in the uplands of the outer coastal plain of the southeastern U.S. (Komarek 1968, Robbins and Myers 1989). Other less fire-adapted species were principally restricted to areas of less frequent fire (*e.g.*, on steep slopes, along river floodplains) where soil and site conditions reduce or preclude the spread of fire (Christensen 1981). Ignition of lightning fires probably occurred as lightning struck living or standing dead longleaf pine trees and spread across the ground, feeding on the highly flammable pine needles and grasses within the ground cover.

Most of the landscape dominated by longleaf pine probably burned by fires ignited by lightning from isolated convectional thunderstorms relatively early in the growing season. Based on an analysis of rain-free periods, the primary season of widely-spreading lightning fires in central and western Louisiana is estimated to have been April through June (Olson 1992). Logic also indicates that most fires occurred early rather than late in the lightning season. Although thunderstorms occur throughout the growing season and could potentially start fires at any time, a place will burn only once during the growing season and then by the first fire that passes through.

Native Americans may have contributed somewhat to the frequency of fires across the landscape during the last 12,000 years (Robbins and Myers 1989). Evidence from early explorer's writings suggest that areas of Florida were frequently burned by Indian hunters during the winter to rouse up game (Bartram 1791, Sauer 1980). Several small populations of Choctaw and Caddo Indians were present in Vernon Parish at the time of European settlement (Wise 1988). However, it is unclear what impact, if any, Native American burning had on the distribution, composition and structure of the natural communities of the Vernon District. It is safe to say that Indian effects varied greatly from place to place across the southeast. The highly pyrogenic natural communities of the outer coastal plain pre-date the presence of man, as demonstrated by the numerous adaptations of many native plants to frequent fire. The effects of Indian burning in naturally fire-frequented areas would probably

have been quite different from aboriginal burns in plant communities less frequented by natural fire. The ability to burn does not necessarily give a civilization control over plant community distributions. We must view man's effect prior to industrialization in the context of a vast unfragmented landscape, in which man had very little control over the spread of fires, whether natural or anthropogenic in origin.

The importance of fire in structuring natural communities of the southeastern United States is well recognized (Garren 1943, Komarek 1965, Vogl 1973, Christensen 1981, Platt *et al.* 1988, Robbins and Myers 1989). Although the fire ecology of most of Louisiana's natural communities is still poorly understood, it is well established that longleaf pine (*Pinus palustris*) is more pyrogenic than any other species of pine in Louisiana. Longleaf pine enhances both the probability of ignition and the intensity of fires (Platt *et al.* 1988), and once ignition occurred, surface fires could sweep across large areas of the presettlement landscape. The natural fire frequency of longleaf pine forests in the southeastern United States has been estimated to be once every 1-5 years (Chapman 1932a,b, Heyward 1939, Christensen 1981). Because neither loblolly pine (*Pinus taeda*) nor shortleaf pine (*P. echinata*) can regenerate successfully when exposed to growing season fires of this frequency (Chapman 1932a, Mohr 1887), the great majority of presettlement longleaf forests contained very few individuals of these species.

Longleaf forests dominated the sandy uplands of the Vernon District, and indeed most of the sandy coastal plain, in presettlement times (Sargent 1884, Wahlenberg 1946). The strong affinity of longleaf pine for sandy soils was widely acknowledged long ago (Lockett 1874, Hilgard 1884, Sargent 1884, Mohr 1897). Longleaf prevailed on sands and sandy loams in the uplands, as well as on fine sandy and silt loams in flatwoods. Decomposition rates are low in these areas (perhaps due to nutrient-poor soils and sclerophyllous vegetation) and fine standing dead herbaceous material accumulates rapidly, enhancing pyrogenicity (Christensen 1987). Longleaf needles are highly flammable and increase fire intensity (Williamson and Black 1981). In plant communities with continuous swaths of flammable fuels near the ground, such as longleaf forests and savannahs, fires consume most of the ground-cover, although patches of vegetation may escape burning (Vogl 1974). Frequent

burning in turn enhances the growth of the ground-cover and therefore the fuel available for subsequent fires; the continuous nature of the herbaceous layer therefore tends to perpetuate itself. Although fire is often classified as a disturbance, in natural longleaf forests it occurred so frequently that it is arguably less a disturbance than a climatic factor.

The absence of fire in longleaf systems leads to the rapid accumulation of pyrogenic material on or near the ground (Christensen 1987). Shrubs and small trees that invade these areas begin to capture and suspend the highly pyrogenic longleaf needles. Subsequent fires tend to return the community to an open forest or savannah condition. By contrast, natural closed-canopied hardwood forests produce relatively non-flammable leaf litter on the ground; such litter is not conducive to carrying fire. Even if a fire does occur, it will be followed by rapid hardwood growth and very little accumulation of fine flammable materials. Under presettlement conditions there was a constant tension between pyrogenic communities characteristic of most uplands and pyrofrenic (fire-inhibiting) vegetation typical of steep and lower slopes, floodplains, and fluvial terraces. Unlike many other natural gradients that control community distributions, gradients in fire frequency and intensity are often very abrupt (personal observation), and the sharp ecotones observed by early surveyors were due to the sorting of species along such abrupt gradients.

In frequently burned longleaf forests, the great majority of hardwoods were unable to reach a size sufficient to resist the fires, and were therefore kept quite small and scattered, generally with above-ground stems less than 10 cm dbh (Harper 1927, Small 1921). The few hardwoods present in original longleaf forests on KNF, primarily blackjack oak (*Quercus marilandica*), post oak (*Quercus stellata*), southern red oak (*Quercus falcata*) and bluejack oak (*Quercus incana*), probably reproduced primarily through asexual clonal spread by producing underground stems which survived the fires (*e.g.* Heyward 1939, Wahlenberg 1946). Occasional individuals escaped to the canopy.

On lower slopes, stream terraces and along intermittent streams, a second major plant association, the mixed hardwood-loblolly forest, was found. The soils are generally fine silt loams with a mesic to wet-mesic moisture regime and contain relatively high levels of plant nutrients. It appears these characteristics encouraged rapid growth of hardwoods, whose leaf litter resisted fires under all but the very driest conditions. Although hardwoods such as

white oak (*Quercus alba*), southern red oak, and dogwood (*Cornus florida*) were common in this community, loblolly thrived as well because it could quickly colonize tree-fall gaps and tolerate considerable shading (Mohr 1897, Platt and Hermann 1986). Fires burning into these areas from adjacent forests and savannahs would have usually smoldered through the leaf litter, killing only the most fire-tender species, such as beech (*Fagus grandifolia*). More intense fires were probably very infrequent and possibly catastrophic. During extreme droughts, fires could potentially have been quite destructive, causing widespread mortality in the mid-story and probably killing many fire-tender canopy trees. Such events would favor more fire-resistant species such as loblolly; however, loblolly is very susceptible to being killed by various types of beetles, and this may have been an important factor limiting loblolly abundance in these forests. Variations of this community also occurred on topographic peninsulas and islands, as well as on very steep slopes. The tendency for peninsulas and islands to have hardwood-dominated forests (formerly often referred to as "climax" forest, *e.g.*, Quarterman and Keever 1962), while adjacent uplands often supported longleaf forests and savannahs, was noticed by Harper (1911), who deduced that the inability of sweeping fires to enter these forests was responsible for the phenomenon. Thus, the composition of mixed hardwood-loblolly forests varied widely, depending on soil, steepness of slope, and degree of topographic isolation from fire. It is likely that, due to year to year variations in weather and the conditions under which fires burned, fires burning down slopes would have done so with variable frequencies and intensities, creating shifting ecotones between longleaf forests and mixed hardwood-loblolly forests in such situations.

In small stream floodplains, riparian forests, dominated by beech, white oak, and loblolly were found, subjected to frequent (although brief) floods. Wetness and the absence of fine flammable fuels made fires rare events here. Riparian forest soils, and consequently their species, varied considerably both between and within sites. During floods, flow rates near active stream channels were much higher than those in backwater areas. As a result, larger sediment particles, particularly sands, were deposited near channels, while silts and clays tended to be dropped in backwaters. Beech and loblolly tended to predominate on the sandy natural levees near active stream channels, while water oak (*Quercus nigra*) and sweet

gum (*Liquidambar styraciflua*) were more common in backwaters. Through a variety of life histories, many species of trees could inhabit these forests. Canopy gaps formed by death of old trees insured the perpetuation of sun-loving gap colonizers such as ironwood (*Carpinus caroliniana*), various oaks, and dogwood, while shade-tolerant species such as beech, southern magnolia (*Magnolia grandiflora*) and American holly (*Ilex opaca*) reached the canopy by growing slowly in the shade.

Within-stand natural dynamics are important in shaping forest structure and composition. One of the most important within-stand forest processes is mortality; patterns of mortality have tremendous importance to forest structure and species composition. Lightning is an important source of natural tree mortality, more so in some communities than others. Although electrocution by lightning is claimed to kill patches of trees as large as one acre (Wade *et al.* 1980), lightning usually kills single trees or very small groups (Platt and Hermann 1986, Platt *et al.* 1988). Lightning has the general effect of maintaining a fairly constant minimum mortality rate in the forest, regardless of tree vigor or distribution.

Wind is another important source of mortality in forests, usually killing single trees or small groups (Platt and Hermann 1986; Platt *et al.* 1988). Susceptibility to windthrow varies greatly among species, and within species among age classes. Generally it is older trees that are more susceptible, although smaller trees are often indirectly killed. Hurricanes (or their remnants) may be important sources of wind mortality in KNF, particularly in the more southerly districts such as the Vernon. Hurricanes at this distance inland would probably not have caused large-scale blowdowns, but would plausibly have killed single individuals (particularly older trees) or small groups. The increase in canopy gaps as a result of these storms undoubtedly encouraged the persistence of gap colonizers in closed-canopied forests and helped maintain structurally heterogeneous forests. Large-scale forest leveling incidents, which create relatively homogeneous stands, also occurred during "downbursts" (strong downdrafts from thunderstorms) and tornadoes; however, downbursts sufficient to cause forest leveling were probably quite rare in north and central Louisiana. Available data on tornado frequencies (Kelly *et al.* 1978) and path dimensions (Howe 1974) indicate a mean return interval at any given location of about 4000 years for tornadoes in north and central

Louisiana (Martin 1992). This would mean that at any given time only about 10% of the landscape has experienced a tornado in the last 400 years. This is sufficient time, assuming no other natural impediments, for successional processes to have generated heterogeneous, uneven-aged forests (characterized by a predominance of old trees) across most of the presettlement landscape.

Insects and other pathogenic organisms can also be important sources of tree mortality. They often interact with other factors, killing mainly trees that have been weakened by age, wind, drought, lightning, or fire. Some organisms are highly episodic in their population dynamics, with outbreaks sometimes killing sizable patches of trees. However, such organisms are usually specific to certain taxonomic groups, and where forest structure is already heterogeneous, they are unlikely to produce large-scale deadenings.

Fire is an important source of mortality in many forests. Since there is great variability among species in fire resistance, fire primarily controls the species composition of stands. However, fire can also control the population dynamics and even the life history of some species. In fire-frequented areas, a species (such as southern red oak) may reproduce primarily clonally, while in more fire-free forests the same species would be characterized by mainly sexual reproduction. In the natural communities of KNF, crown fires covering sizable acreages are virtually unknown, now or in presettlement times. Instead, fires may kill a percentage of canopy trees, an effect that varies with burn conditions and from one community to another. Fires often have much greater effects on understory trees and shrubs, limiting the density and age of above-ground stems in some communities.

Competition among trees for light and/or soil moisture and nutrients is often a major source of mortality, particularly for younger trees (Glitzenstein *et al.* 1986; Platt and Hermann 1986; Platt *et al.* 1988). Under natural conditions seedlings of shade-intolerant species tend to be concentrated in canopy gaps, producing dense clumps which gradually self-thin. The large numbers of juveniles present in almost any natural forest (not subject to excessive herbivory) are usually inconspicuous because they are patchy. Although some species are able as juveniles to grow in the shade of adults, even these usually are clustered in gaps, and most species must quickly reach the canopy if they are to survive. In older natural forests containing long-lived tree species not subject to frequent blowdown, canopy

gaps almost always constitute a small fraction of stand area.

Small-scale soil disturbances, produced by tree falls (tip-up mounds) and other natural causes, were common, and native herbaceous weeds (short-lived, opportunistic invaders), such as cypress-weed (*Eupatorium capillifolium*), horse-weed (*Conyza canadensis*), and bitter-weeds (*Helenium* spp.), are adapted to quickly colonize such soil disturbances, particularly in sunlit canopy openings. Because these species are replaced through succession by others from the surrounding undisturbed ground-cover (usually long-lived and vigorous competitors, such as little bluestem [*Schizachyrium scoparium*] and blazing-stars [*Liatris* spp.] in upland pine systems), the weeds are fast-growing fugitives, highly fecund and strongly vagile. They usually persist only for short periods at any one spot. The overall result is a forest floor dominated by long-lived perennials but containing small, constantly shifting patches of disturbed soil dominated by ephemeral weeds, a process analogous to the gap dynamics occurring in the canopy of many forests.

Flooding is an important source of tree mortality in some communities, but its effects are less dramatic than is sometimes imagined (Streng *et al.* 1989). Like fire, it primarily controls the species composition of forests, but flood events can also cause considerable mortality of juveniles of most species. More importantly, persistent flooding can deprive tree roots of oxygen, cause widespread mortality even in the canopy and, consequently, cause one plant association to be replaced by another. This occurs frequently on a small scale when beavers construct dams along small streams.

It seems clear that within-stand dynamics would combine in the absence of man to produce, over time, predominantly heterogeneous, multi-aged stands in the natural forests of KNF. Regeneration is essentially continuous, but patchy, resulting from the deaths of single or small groups of trees. Because crown fires and full-force hurricanes are not characteristic of KNF, and tornadoes appear to have very long return intervals, natural disturbance regimes at KNF are instead chiefly expressed as small-scale patch dynamics.

DETERMINING PRESETTLEMENT CONDITIONS

The Vernon District is the most southerly of all districts within KNF and is found completely within the historic range of longleaf pine in the West Gulf Coastal Plain. In

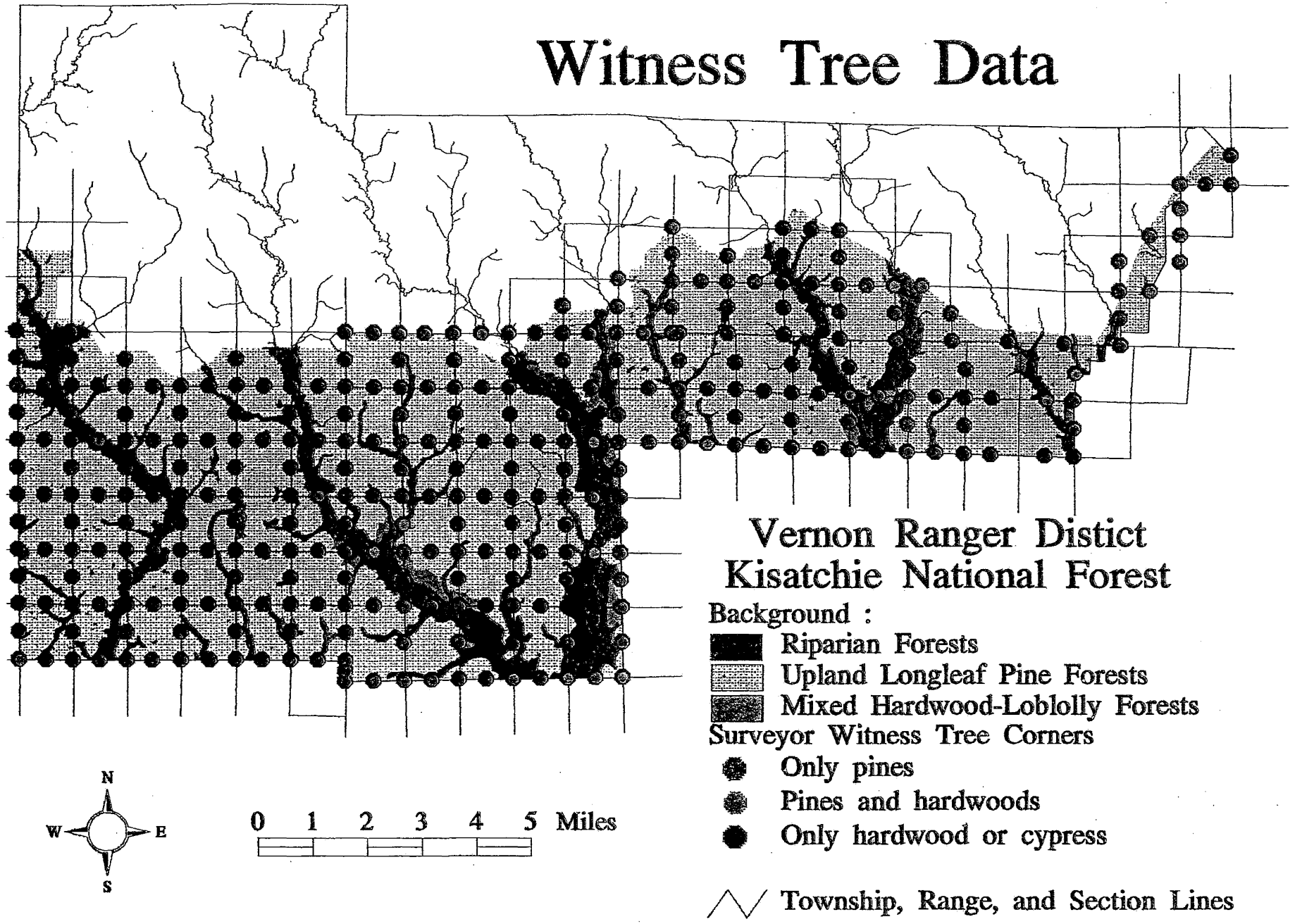
reconstructing the natural communities of the district, a variety of sources was used. These included early land survey data from GLO surveys of the mid-1800's, descriptions provided by early explorers, geographers and naturalists, ecological and geological studies, and present-day vegetation surveys. The GLO surveys of the area (Bradford and Kap 1877a, Bradford and Kap 1877b, Bradford and Kap 1878, Bradford 1880 and Bradford 1882) were a most important source of information and formed the primary basis for reconstructing the distribution of major presettlement forest community types. Although some subjectivity in the analysis of these data was inevitable, cross-checking between surveys and with other sources was performed to corroborate our assessments regarding forest community distributions.

A map depicting a colorized summary of the trees recorded in the original GLO survey of the Vernon District, and shown on a background of the estimated presettlement natural community distributions for the area, is presented in Figure 1. In this figure, section corners and quarter-section corners are coded as follows: red circles represent corners at which all witness trees were pines, green circles represent corners at which both pines and hardwoods were recorded, and blue circles represent those at which only hardwoods were recorded. It can clearly be seen that most trees recorded for the Vernon District were pines; these were primarily on hilly uplands and broad flatlands. Hardwood trees were recorded principally in or near stream bottoms (riparian forests, bayhead swamps) with few hardwoods on the upland areas.

Ancillary information regarding the character of natural communities was recorded from the survey data. For example, most of the pine forests were described as"open" or with "very fine grass" with no undergrowth present, as opposed to "swamps" (stream bottoms) that were described as having a dense undergrowth of bushes and vines. This information strongly suggests that the pine forests were very open, grassy areas and relatively hardwood free.

The open pine-dominated and grassy aspect as described by the early land surveyors clearly indicates an essentially pure longleaf pine community type was present on the uplands. The general absence of hardwoods and prevalence of pines in the "pine woods" strongly suggests a forest created by high fire frequency. Given that hardwoods readily

Figure 1. General Land Office Survey witness tree data for the Vernon District superimposed on the estimated presettlement distribution of the major natural communities. See also Figure 2.


Witness Tree Data
Vernon Ranger Distict
Kisatchie National Forest
Background :
Riparian Forests
Upland Longleaf Pine Forests
Mixed Hardwood-Loblolly Forests
Surveyor Witness Tree Corners
Only pines
Pines and hardwoods
Only hardwood or cypress
Township, Range, and Section Lines
N
W
E
S
0 1 2 3 4 5 Miles

invade coastal plain pine forests in the absence of fire and that high fire frequencies suppress hardwood growth, it is clear based on early descriptions that a high fire frequency forest type dominated the uplands and flatwoods of what is now the Vernon District. There is little question that longleaf pine prevailed since it is the only native Louisiana pine that can regenerate under high fire frequencies. That longleaf pine was dominant across the uplands and flatwoods of the area is further substantiated by the early recorded observations of Lockett (1874), Hilgard (1884), Sargent (1884), Mohr (1897), Schwarz (1907) and others regarding the composition and character of central and south Louisiana's piney woods.

The estimated presettlement distribution of the major community types on the Vernon District is shown in Figure 2.

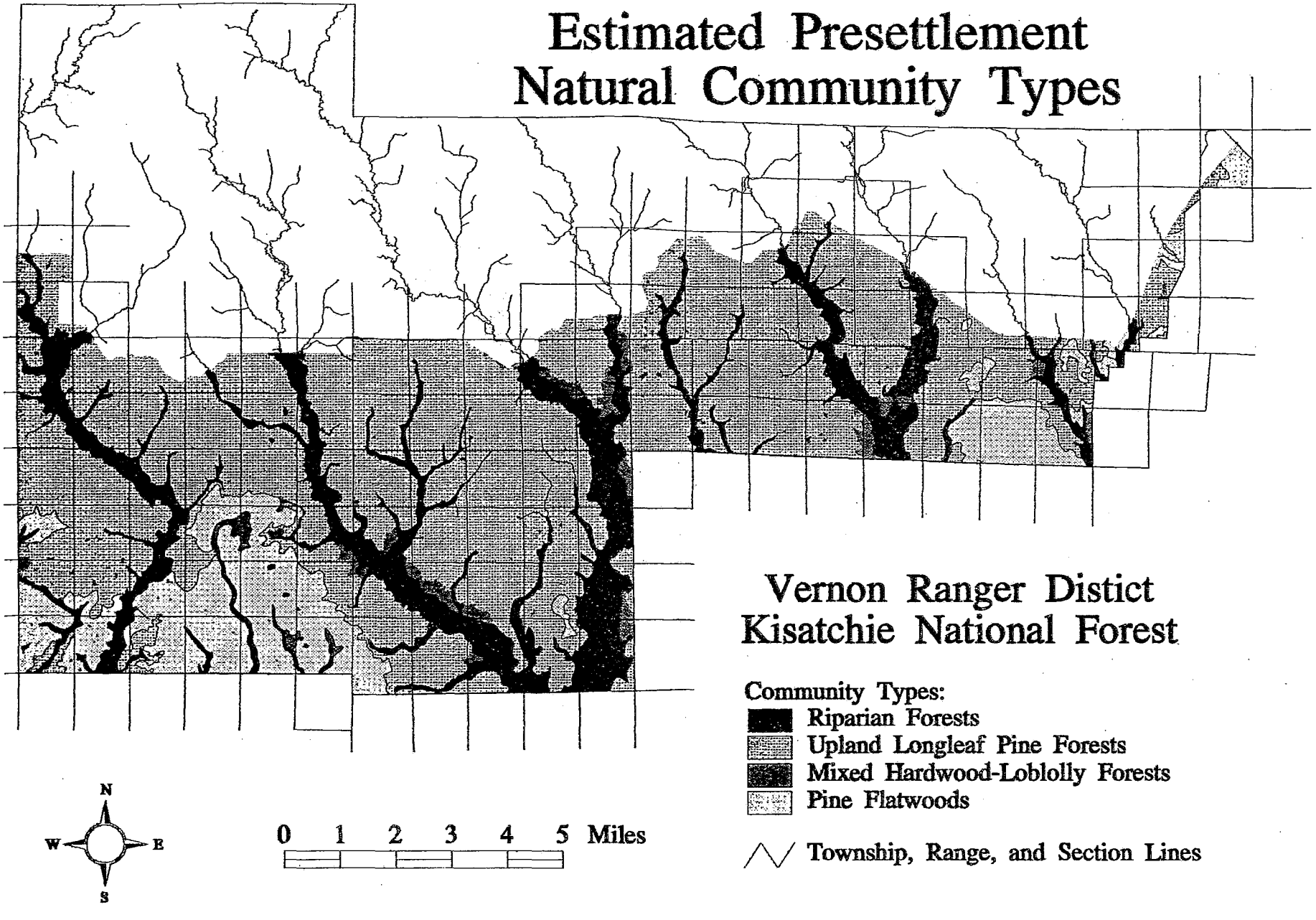
Geology

While fire was arguably the principle ecological force that segregated plant assemblages on the landscape, the distribution of natural plant communities corresponds quite closely to soil type distributions which in turn relate to the underlying surface geology. The area surveyed on the Vernon District (exclusive of the "Intensive Use Area") is underlain principally by Quaternary deposits but Tertiary-age deposits are present to a limited degree at the surface in the north of the area. Following is a brief description of the surface geology of the surveyed area on the Vernon District (following Snead and McCulloh 1984), proceeding from the oldest to the most recent formations.

Fleming Formation - A Tertiary formation, found only in the northwestern portion of the survey area. Only one member of the formation is present here, the Blounts Creek Member.

Blounts Creek Member - limited to the northwestern part of the surveyed area and outcropping in compartments 2, 5, and 6. This member, Miocene in age, is fluvial in origin and consists of gray to green silty clays, siltstones, silts and abundant sand beds. It contains up to 45 percent medium to very fine-grained sand with intervals of non-calcareous clays, silty clays and silts separating the sand zones (Welch 1942). Deep sands are characteristic of this member. Locally, beds of silt and sand are indurated and form siltstone and sandstone

Figure 2. The estimated presettlement distribution of the major natural community types of the Vernon District, Kisatchie National Forest.


Estimated Presettlement
Natural Community Types
Vernon Ranger Distict
Kisatchie National Forest
Community Types:
Riparian Forests
Upland Longleaf Pine Forests
Mixed Hardwood-Loblolly Forests
Pine Flatwoods
Township, Range, and Section Lines
N
W
E
S
0 1 2 3 4 5 Miles

outcroppings. The member is decidedly acidic in character and gives rise predominantly to acidic sandy loams and loamy sands. Such edaphic conditions in the outer coastal plain are ideal for longleaf pine communities, which dominated the historic landscape of the area.

Pleistocene Terraces - Most of the surveyed area of the Vernon District is made up of Pleistocene Terraces. Two formations are currently recognized within the surveyed area, High Pleistocene Terraces and Holocene Alluvium.

High Pleistocene Terraces - Found throughout the great majority of the surveyed area, these terraces consist of a few inches to many feet of highly weathered mixtures of chert gravel and fine to coarse-grained, cross-bedded sand, silt and clay deposited over underlying Tertiary sediments (Autin *et al.* 1991). The High Terraces give rise to acidic soils with surface textures ranging from silty loam to sandy loam to loamy sand. The topography is variable, ranging from rolling hills in the northern portion of the area surveyed to almost flat (flatwoods) in the southern portion of the district. These terraces historically were covered almost exclusively with longleaf pine communities.

Holocene Alluvium - The larger stream bottoms of the district (*e.g.*, Bundick, Drake's, Whiskey Chitto, Bird's, Sixmile, and Brushy Creeks) are delineated geologically as Holocene Alluvium by Snead and McCulloh (1984), but several of the smaller streams, including those supporting bayhead swamps, are also on this formation. Soils are typically silt loams or loamy fine sands. Most of the stream bottoms in the survey area are sandy-bottomed streams with very narrow floodplains.

Soils

There are twelve soil series currently recognized within the surveyed area of the Vernon District: Beauregard fine sandy loam, Betis loamy fine sand, Boykin loamy fine sand, Briley loamy fine sand, Caddo silt loam, Cahaba fine sandy loam, Gore very fine sandy loam, Guyton silt loam, Malbis fine sandy loam, Osier loamy fine sand, Ruston fine sandy loam, and Susquehana fine sandy loam. These soil series are grouped within three soil

orders, Ultisols, Alfisols and Entisols, as defined by the U.S. Comprehensive Soil Classification System (USDA 1989).

Of the twelve soil series, Beauregard, Betis, Boykin, Briley, Cahaba, Malbis and Ruston are classified as Ultisols. This soil order consists of soils that are deep, highly weathered, and acidic. They are characterized by strongly acidic sandy loam or loamy sand surface layers and a strongly acidic lower clay accumulation layer. The soils are often a reddish color with a base saturation of less than 35 percent (Donahue *et al.* 1977). Vegetation associated with Ultisols is generally adapted to well drained, acidic, and nutrient-poor conditions (Hart and Lester 1993, Bridges and Orzell 1989). On the Vernon District, these soils were vegetated almost exclusively with longleaf pine.

Four of the twelve soil series, Caddo, Gore, Guyton, and Susquehana, are classified as Alfisols. These soils are similar to Ultisols but differ by having more available primary minerals and plant nutrients; they possess a base saturation of greater than 35 percent at 50 inches below the upper boundary of the argillic horizon. Because of their comparatively nutrient-rich character, Alfisols are conducive to supporting vegetation, such as mixed hardwood-loblolly pine forests, that requires relatively high levels of plant available nutrients (Hart and Lester 1993). However, fire played a critical overriding role in controlling distributions of plant communities and favored maintenance of longleaf pine communities on fire-exposed uplands on Alfisols.

One of the twelve soil series, Osier, is classified as an Entisol. This soil order contains soils that have minimal horizon development in the profile. The Osier soil series is hydric and of limited extent within the surveyed area of the Vernon District; it is generally associated with small areas of hillside seepage bogs and bayhead swamps along the upper reaches of small creeks. Many of the Osier soil occurrences have probably not been mapped within the Vernon District since they usually do not exceed 10 acres in area, a standard minimum map unit requirement in soil mapping (Novosad, Pers. Comm. 1995).

HYDROLOGY

All of the surveyed area of the Vernon District falls within the watershed of the Calcasieu River. In this area, all of the creeks drain eventually into the Calcasieu River to

the east, and originate either within the surveyed area of the Vernon District or just north of this area (in the USFS Intensive Use Area or the Main Post of Fort Polk Military Reservation) and flow southeastward. Permanent streams within the surveyed area include (from west to east): Bundick, Drake's, Whiskey Chitto, Birds, Little Sixmile, West Fork Sixmile, East Fork Sixmile, Little Brushy and Big Brushy Creeks.

PRESENT-DAY NATURAL COMMUNITIES

OVERVIEW

The ecological processes that were important in determining the presettlement landscape of KNF continue to play a significant role in present-day vegetation patterns on the landscape. However, the capacity of these ecological processes to determine the structure, composition and distribution of plant communities within KNF is today limited due to extensive anthropogenic constraints.

Historical Background

The logging boom during the 1890's to the late 1920's induced some of the greatest changes in the natural plant communities of the district. At the time that Vernon Parish was established (1871) the area was described as being comprised almost entirely of forest, mostly with longleaf pine (Wise 1988). As early as 1890, small, multi-purpose, water-powered mills, that functioned in-part as sawmills, began to operate in Vernon Parish. These small mills were rapidly replaced by much larger mills as timber supplies dramatically rose in conjunction with the introduction of the Kansas City Southern Railway into Vernon Parish in 1897 (Wise 1988). With large timber companies able to buy land at 50 cents to $1.00 per acre (Wise 1988), the forests of the area were opened to rapid exploitation.

In the period from early 1900's to late 1920's much of the economy of Vernon Parish was dependent on the timber industry (Wise 1988). Small towns emerged, centered around the sawmills that supported most of the parish. These towns provided medical services, housing, barbershops, grocery stores, clothing stores, and other goods and services. By the 1920's there were many small mills and at least five large mills in Vernon Parish that had a daily capacity of 100,000 board feet (Wise 1988). Large mill towns of the time included

Slagle, Pickering, New Llano, Barham, Fullerton and Neame. Remnants of the Fullerton mill town have been designated as a historic site within the Vernon District. Few of the old sawmill towns of the era exist as towns today.

The introduction of steam-powered skidders and loaders made the transport of logs from the forest to the railways much faster and more efficient than the earlier mule and oxen teams. By the late 1920's Vernon Parish was covered by a network of railways for timber and lumber transport. As a result of increased efficiency of timber removal and transport to the mills, by 1928 over 70 percent (or about 870,400 acres) of the virgin longleaf pine forests had been cleared (Wise 1988).

From the beginning of the boom of industrial forestry in Louisiana, fire began to be deliberately or unintentionally suppressed. The highly pyrogenic longleaf forests were rapidly stripped from the uplands, and an increasingly intricate network of artificial fire-breaks kept most fires from burning huge acreages. As the timber boom reached its peak in the early twentieth century, some foresters expressed concern that timber was being depleted and not replaced (Burns 1968), and many were gravely concerned about the continuing practice of woods burning (Pyne 1984). As a result, planting of longleaf, loblolly and slash pine (*Pinus elliottii*) began in much of the original longleaf range, particularly as the timber boom neared its end in the 1930's (Wahlenberg 1946, Croker 1987).

The 1930's were a time of reforestation for the Vernon district and for the parish. This area was selected in 1934 for reforestation by the Civilian Conservation Corps (CCC). As a result of this project, over 31,000 acres of land were planted by hand in pines. Not only longleaf pine was planted but also slash and loblolly pines (Wahlenberg 1946, Croker 1987). One of the CCC headquarters of the time was located within the boundary of the Vernon District and is designated today as the Cypress Pond Recreation Area (Baswell, pers. comm.).

Consequent with fire suppression efforts, regenerating loblolly and slash pines thrived in the absence of frequent fires. Even where loblolly was not planted, its prolific seed production and high dispersal capabilities often resulted in its invasion into former longleaf areas. Sweet gum and black gum (*Nyssa sylvatica*), seldom recorded on the uplands by the nineteenth-century surveyors, became ubiquitous. Very few longleaf forests survived the

clearcutting, but many of those that did were, with the reduction of fire, heavily overrun by hardwoods and shrubs, shading out the sun-loving herbaceous ground cover. A principal outcome of these effects was the replacement of many longleaf forests with loblolly pine and slash pine forests.

By the 1960's, the beneficial role of fire in longleaf pine communities had become clear through substantial research that proved, among other benefits, high fire frequency reduces the invasion of hardwoods and loblolly pines into longleaf pine forests (*e.g.*, Heyward 1939). During this time, prescribed burning became a widely accepted management tool on USFS lands in the southeast, including the Vernon District. Longleaf pine forests exposed to fires began to be partially restored as many hardwoods and shrubs that had encroached into longleaf areas began to be killed by fire. Heliophytic species persisting in the ground cover of overgrown forests were encouraged to spread as stands began to be opened up through burning.

Fire is intensively used today as a management tool on the district to encourage and restore the remaining longleaf pine forests using both dormant-season and occasional growing-season prescribed burns.

Modern Forest Stand Management

Most of the Vernon District of KNF was clearcut by the 1930's. Although examples of all natural community types believed to have been present in presettlement times still exist on the Vernon District, present-day forest structure and, in many cases, community distribution and composition have been altered by current and past silvicultural practices. These characteristics are substantially different from those present during presettlement even where intensive plantation forestry has not been practiced. Prevailing timber management practices of today interfere dramatically with natural ecological processes that historically shaped the landscape.

Current USFS forestry practices divide the landscape into compartments, and within compartments, break it up even further into forest stands. Typically, each forest stand is considered a homogeneous unit possessing the same forest type, structure and age throughout. Up until recently, when a stand reached rotation age on the Vernon (50-120

years for KNF, depending on forest type), the stand was usually harvested using the shelterwood or seed-tree silvicultural method to regenerate an even-aged stand. This timbering strategy was modified in Red-cockaded Woodpecker (RCW, *Picoides borealis*) areas. Pure clearcuts in the modern era have been rare on the Vernon District.

Following timber removal, a variety of site-preparation techniques (*e.g.*, mechanical, chemical, or a combination) are often used to prepare the soil for reseeding by residual trees. "Leave trees" are typically removed when acceptable stocking levels of young pines are attained. As the new stand matures, periodic thinning is implemented to encourage better growth of remaining stems and to eliminate diseased, ill-formed or commercially undesirable trees. When the stand reaches rotation age, the process would be repeated, or so it had been planned. Recent and potential future developments in management direction for RCW's could significantly affect the continued implementation of this forest management strategy.

Some of the effects of past logging and silvicultural practices on forest structure of the Vernon District include: 1) almost all stands, particularly pine stands, are essentially even-aged with few trees greater than 120 years old (there are some scattered clusters and isolated "relics" in longleaf stands); 2) practically all pine stands are greatly dominated by trees less than 70 years old (juveniles); 3) frequent thinning of stands produces structurally homogeneous stands of fairly even-spaced trees; and 4) relatively few standing dead trees (snags) or fallen logs are present within stands.

In contrast, natural forest structure includes: 1) trees greater than 200 years old as dominants in most stands (many forest species have natural longevities in excess of 200 years); 2) trees of many ages within stands, with juveniles occupying only a small percentage of forest area; 3) variable tree density throughout the stand; 4) many standing snags and fallen logs present in stand.

Simplified and greatly transformed forest community structure resulting from intensive silvicultural management results in the loss of habitat for many species, while the increase in forest homogeneity may amplify the incidence of forest disease and insect outbreaks. The fragmentation of mature forest areas into young even-aged stands creates a landscape in which relatively undisturbed patches characterized by disturbance-sensitive species become surrounded by recently disturbed stands typified by disturbance-following (or

tolerant) species (*i.e.*, weeds), rather than the reverse landscape pattern which would result from natural processes. Weeds flourish and sensitive species decline.

Site preparation is a common silvicultural practice used in the establishment of pine plantations that has significant effects on the composition and structure of native ground cover communities. A variety of techniques is used on KNF for preparing the soil for stand regeneration. The predominant methods are various mechanical and chemical (or some combination of the two) treatments of an area to reduce competition for pine stand establishment. Soil disturbance associated with mechanical site preparation greatly alters the native herbaceous ground cover, inducing the proliferation of both native and exotic weeds (opportunistic invaders of disturbed habitats) at the expense of longer-lived, less prolific or less common native species (L. Smith, personal observations; Dr. Jeff Glitzenstein, personal comm.). Large areas of soil disturbance were not a common feature of the presettlement landscape. This scale of disturbance promotes the invasion of weedy species into remaining patches of relatively natural ground cover. The long-term effects of repeated use of herbicides on ground cover communities is unknown.

Two additional land management practices that have influenced the structure, composition and distribution of natural communities of the Vernon District are gravel mining and cattle grazing. Gravel mining has been practiced in many places on the district (*e.g.*, compartments 10, others). Because it involves denudation and deep soil removal, mining has an even greater impact on native plant communities than silvicultural practices, although such mining is of much less extent. While in many cases native tree species are replanted, essentially all of the original native shrub component and ground cover is totally lost due to removal of living plants and the soil seed bank by mining. In this situation, the recovery of native plant communities is dependent upon recolonization of the site by native species from adjacent natural communities, a process that may take very long periods of time.

Cattle grazing, depending on its intensity, can have a significant impact on the structure and composition of natural plant communities. Intensive grazing (*i.e.*, high density of cattle), favors weeds that are not palatable to cows (*e.g.*, goat weed [*Croton capitatus*]) at the expense of native grasses and forbs that are preferred forage. In some areas on the Vernon District, a large proportion of the native herbaceous component has been replaced by

native and non-native weeds (*e.g.*, compartments 21, 22).

THE VERNON DISTRICT TODAY

Today, the landscape on and near the Vernon District is a highly variable mosaic of conditions. It encompasses many areas greatly modified from their presettlement character, predominantly young and dense slash and loblolly pine plantations in former longleaf areas. On the other hand, it supports some of the highest quality longleaf forests and other natural plant communities remaining in western Louisiana. The Vernon District today is a landscape that strongly reflects land-use patterns and alterations of the last century, but yet one which retains much of its natural character with longleaf pine dominating much of the uplands and natural mixed forests predominating along stream courses.

The distribution of the present-day major forest types of the district (as defined by USFS cover types) are illustrated in Figure 3, and this may be compared to the distribution of presettlement forest types presented in Figure 2 (pg. 15). A comparison of the current acreage of longleaf pine, slash pine and loblolly pine (by percentage occupied of each compartment) in the surveyed area of the district is given in Table 1. As with other districts of KNF (see Martin and Smith 1991, 1993), the Vernon District has experienced a considerable reduction of natural longleaf pine communities with a corresponding increase in loblolly and slash pine forests. Although there has been a significant loss of longleaf pine communities on the Vernon District since presettlement times, the district nevertheless has the greatest acreage of longleaf pine forest remaining of any KNF district. Of the approximately 45,000 acres that comprise the surveyed portion of the Vernon District, about 19,000 acres (42%) support longleaf pine forest (data from KNF, Vernon District, 1995).

Although a large percentage of the Vernon District still contains longleaf pine, a striking reduction in longleaf pine communities has taken place compared to presettlement conditions (see Figures 2 and 3). The major reason for the reduction in longleaf pine forest has been the conversion of many areas to other pine species (see discussion under *Historical Background*).

Figure 3. Current forest coverage types of the Vernon District, Kisatchie National Forest.

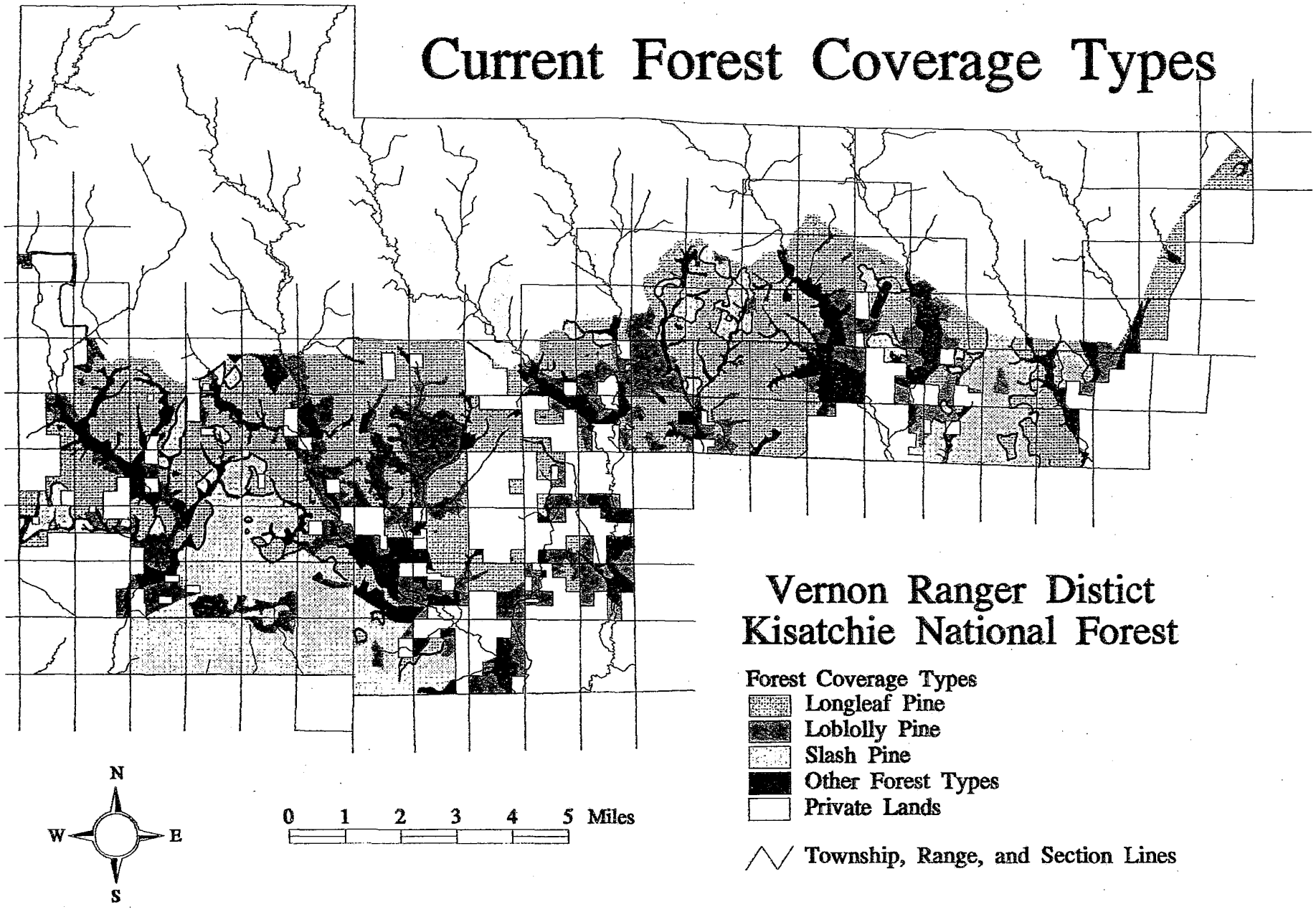

Current Forest Coverage Types
Vernon Ranger Distict
Kisatchie National Forest
Forest Coverage Types
Longleaf Pine
Loblolly Pine
Slash Pine
Other Forest Types
Private Lands
Township, Range, and Section Lines
N
W
E
S
0 1 2 3 4 5 Miles

Table 1. Comparison of the current forest cover types of longleaf, slash and loblolly pine (as assigned by the Kisatchie National Forest) for the surveyed area within the Vernon District, KNF. Data provided by Kisatchie National Forest as of February 13, 1995.

COMP[1]	TOTAL ACRES	TOTAL STANDS	ACRES (%) LONGLEAF	ACRES (%) SLASH	ACRES (%) LOBLOLLY	ACRES (%) OTHER
1	896	45	38.6	32.9	9.4	19.1
2	1506	41	56.5	0	13	30.5
3	1516	34	27.3	7.9	25.8	39
4	1713	26	37.2	43.5	1.6	17.7
5	1602	35	61.1	0	4.9	34
6	1150	41	39.7	44.6	3.5	12.2
7	1337	24	0	97.5	0	2.5
8	1665	24	0	80.9	18.3	0.8
9	1078	31	68.3	7.1	5	19.6
10	1743	63	71.2	0	17.5	11.3
11	972	34	52.9	0	36.9	10.2
12	1438	14	0	97.8	1.4	0.8
13	1852	31	29.3	28.1	15.9	26.7
14	1428	32	59.9	0	36.8	3.3
15	1922	38	40.9	0	53.7	5.4
16	954	25	60.4	0	16.7	22.9
17	852	22	73.2	0	15	11.8
18	1554	31	6.6	21.9	35.7	35.8
19	894	19	13.6	0	38.4	48
20	1609	60	41.2	0	21.7	37.1
21	1573	44	44.2	4.1	36.8	14.9
22	1349	48	57.8	12.5	11.2	18.5
23	1614	44	54	22.9	10.7	12.4
24	1719	62	66	0	18.3	15.7

Table 1. Cont'd.

25	970	25	76.5	0	3.6	19.9
26	1705	40	45.6	0	11	43.4
27	1209	36	0.5	68.9	18.9	11.7
28	1083	28	60	21.1	3	15.9
29	1262	31	27.4	20.4	22.7	29.5
30	1211	35	64.7	1.4	9.7	24.2
31	1203	38	42.5	14.2	19.7	23.6
32	1351	35	70.5	0	7.1	22.4
33	1093	13	28.9	42.7	4.6	23.8
AVERAGE			42.2	20.5	17.2	20.1

[1] COMP = Compartment

The introduction of slash pine, principally by the CCC in the 1930's, has occurred extensively in the flatlands of the southwestern, and, to some extent, in the eastern part of the district. Slash pine was not a native species of this region during presettlement times (Sargent 1884). Today, over 20% of the Vernon District contains slash pine forests, with essentially entire compartments converted from longleaf pine communities to slash pine plantations (mainly compartments 7,8, 12 and most of 27).

In addition to the introduction of slash pine plantations, loblolly pine plantations have replaced native longleaf pine throughout the district. During presettlement times, loblolly pine was naturally restricted to mixed hardwood-loblolly forests on lower slopes and along major streams, and did not occur in monospecific stands as now seen in many plantations. Today, over 17% of the district is comprised of loblolly pine plantations that are managed mainly for timber production. Most of this conversion from longleaf pine forests to loblolly pine plantations has transpired in the southern portion of the district (mainly compartments 15, 18 and 19) with some conversion in more northern portions of the district (mainly compartments 14 and 21).

All of the existing stands of longleaf pine are even-aged immature forests, generally 60-80 years old, that represent regrowth from natural sources or planting after the massive logging earlier in the century. Older trees (greater than 100 years) can still be found scattered about the district as a result of undesirable or overlooked trees left uncut during the original cut-over. It is interesting to note that Red-cockaded Woodpecker colonies of the district appear strongly associated with these old remaining relic trees (pers. obs.).

Not only have longleaf pine forests been greatly reduced in extent but much of the community structure within many existing longleaf stands has been significantly degraded. Other than the massive forest clearing of the early 1900's, the primary factor responsible for degradation of structure and species composition in this community has been inadequate fire and past application of fire almost exclusively in the dormant season. [Note: Even though this is the case, we must point out that the Vernon District has traditionally used prescribed fire more than any other on KNF]. Isolated or peripheral longleaf pine forests on the district that are adjacent to private lands are difficult to prescribe burn under current guidelines. As a result of this lack of burning and general use of winter burns, there are a number of

longleaf pine stands on the district that are heavily invaded with hardwoods and less fire-tolerant pine species (*e.g.*, loblolly pine) and that contain a low diversity of native ground cover species. Among other effects, frequent fires (particularly in the growing-season) prevent hardwoods, fire-sensitive pines and shrubs from invading and consequently shading out herbaceous flora, and promote a rich, vigorous ground cover.

The foregoing notwithstanding, large tracts of longleaf pine forests in excellent condition can still be found on the district. In fact, the greatest concentration of longleaf pine acreage remaining in Louisiana is present on the Vernon District and the adjcacent Fort Polk Military Reservation. High quality longleaf pine forests are found scattered throughout, but the majority are in the northern portion, mainly compartments 10, 14, 21 and 25, and along a belt that runs northwest-southeast that includes compartments 22, 23, 24, and 26. Arguably, the best examples are found in the northeastern corner of the district in compartment 32. Parts of the eastern region of the district also contains some high quality longleaf pine forests (compartments 2, 5, and 6), as well as a small central portion of the district (compartment 16). A part of the southwestern region of the district contains a relatively high quality longleaf pine flatwoods area (compartment 28).

Good examples of natural mixed hardwood-loblolly pine forests can still be found near larger streams in the district (*e.g.*, Whiskey Chitto and Drake's Creek). Most of this community type has been clearcut within the last 50-60 years and is in second-growth forest today. In such places, the forest structure is characterized by young trees and a fairly dense midstory of saplings, shrubs and brambles with little to no canopy closure.

There are also good examples of riparian forests on the district. This community type is associated with floodplains of the major creeks on the district (Whiskey Chitto and Drake's Creek). As with the mixed hardwood-loblolly pine forests, most of the riparian forests on the district have had much of the timber removed within the last 60 - 90 years. Most of the riparian forests remaining are in second-growth condition, with occasional small patches containing very large loblolly pine trees (over 36 inches in diameter). For the most part, however, second-growth riparian forests on the district have little to no closed canopy, immature dominant trees and a thick midstory of juvenile trees (saplings) and shrubs.

NATURAL COMMUNITY ACCOUNTS
A DESCRIPTION OF
THE NATURAL COMMUNITIES OF THE VERNON DISTRICT

The natural community accounts presented in this section describe the palustrine and terrestrial natural plant communities of the Vernon District. These general plant communities (present in various successional stages), and the ecotones between them, occupied essentially the entire presettlement landscape of the district and are still present today, although more or less altered from their original condition and distribution. The known palustrine and terrestrial natural plant communities of the district include:

Palustrine
- Hillside Bog
- Wooded Seep
- Bayhead Swamp
- Pine Flatwoods/Pine Savannah
- Riparian Forest

Terrestrial
- Mixed Hardwood-Loblolly Forest
- Upland Longleaf Pine Forest

In the following descriptive accounts of the natural communities, a standardized format addressing various community characteristics was developed. Some explanation is needed for certain of the entries:

Associated Surface Geology: The surficial geological formations as depicted by Snead and McCulloh (1984) with which a particular community has been found to be associated on the Vernon District.

Community Dynamics: The following literature was used for determining maximum tree ages in various communities: Mohr 1987, Winters *et al.* 1938, Lorimer 1980, Glitzenstein *et al.* 1986, Platt and Hermann 1986, and Platt *et al.* 1988.

Vegetation: Plant identification follows Radford *et al.* (1968) and Correll and Johnston (1970). Plant nomenclature predominantly follows Kartesz (1994).

Floristic Diversity Range: A subjective judgement of the relative richness of vascular plant species in the community as compared to other communities. Used to provide some indication of the biodiversity of each type.

PETS Potentially present: A listing of the KNF-designated sensitive plant species that are known to occur in the general community type, including those species not currently known form the Vernon District. There are at this time no Federal-listed endangered or threatened plant species known from the district.

NATURAL COMMUNITY NAME: Hillside Bog

[Note: This plant community is now designated as Western Hillside Seepage Bog by the Louisiana Natural Heritage Program. The name Hillside Bog has been retained here for consistency with the previous reports: Martin and Smith 1991, Martin and Smith 1993]

SYNONYMS: Western Hillside Seepage Bog, Pitcher Plant Bog, Herbaceous Bog

TOPOGRAPHIC POSITION:

On seepy hillsides of variable degree slope in hilly terrain. May be upper slope, but more commonly mid-slope and most commonly lower slope.

ASSOCIATED SURFACE GEOLOGY:

High Pleistocene Terraces
Fleming, Blounts Creek Member

SOILS:

Deep, poorly drained, very strongly acid loamy fine sand with relatively high organic matter content. Available water capacity is high, surface runoff if very slow to ponded. Inherent fertility is low. The surface layer remains wet year round. May be mapped as Osier. Hillside Bogs form exclusively in uplands that possess sandy to very sandy soils, and that typically have an impermeable subsurface layer.

HYDROLOGY: Palustrine, permanently saturated by seepage flow.

APPEARANCE:

Open, mostly treeless, herb-dominated community, but shrub thickets (Wooded Seeps) and some scattered trees may be present. The herbaceous groundcover is dense, continuous and floristically rich. Hillside Bogs are variable in size but are most often less than 1 acre, and may rarely exceed 10 acres. Water is often conspicuously seeping from various places on the hillside within the bog.

COMMUNITY DYNAMICS:

Because Hillside Bogs are embedded in what are now or historically were longleaf pine forests, they are fire-driven systems. They evolved with frequent growing-season fire

events. Among other things, frequent fire deters invasion by shrubs and trees and stimulates growth, flowering and seed production by indigenous bog herbs. Dormant-season and growing-season fires are fundamentally different in the effect each has on the plant community. Without fire, Hillside Bogs will eventually succeed into Wooded Seeps (see discussion under Wooded Seeps).

Hillside Bogs are integrated hydrologically with surrounding habitats (Platt *et al.* 1990). Water seeping out at the bog surface originates from upslope rainfall that percolates through the soil and moves along a sloping gradient created by an impermeable layer (*e.g.*, clay, sandstone, siltstone). The flow of water is directed by hydraulic conductivity and soil porosity until it reaches the surface at a point where depth to the impermeable layer is very shallow. Surface soil characteristics determine the degree to which water percolates through the soil. Water infiltration into a soil generally increases as the percentage of sand and soil depth increases. Under saturated conditions, water flow in coarse-textured soil will be faster than in fine-textured soils; however, total storage capacity will be greater in fine-textured soils.

The size of the recharge area or watershed is also important. Since the impermeable layer is the remnant of an old erosional surface, drainages and divides may still be present but covered by more recent geological deposits. The general slope and drainage pattern of this old erosional surface may bear no resemblance to present-day topography and actually defining any bog's watershed boundaries would be quite complicated. One of the few generalizations that can be stated with certainty is that water feeding a hillside seep must come from positions topographically higher than the seep itself.

The degree to which a bog remains wet throughout the year will depend on the size of the watershed, the soil infiltration rate upslope, the rate of saturated flow in the soil, the topographic position of the bog, the bog's water storage capacity, and the rate of water leaving the bog from evapo-transpiration and surface and sub-surface flow. In general, the greater the infiltration rate of the watershed soils and the water holding capacity of bog soils, the smaller recharge area needed to maintain seepage throughout dry periods of the year.

Hillside Bogs have generally nutrient-poor soils which inhibit tree growth. Fire excludes other species of pines, and longleaf occurs only as scattered individuals in the community. The trees seldom exceed 40 feet in height or 20 inches dbh.

VEGETATION: Rich in species. There appears to be a distinct relationship between the number of species present and bog size (MacRoberts and MacRoberts 1992, 1993); more than 100 plant species may be found in a relatively large bog (MacRoberts and MacRoberts 1988, Nixon and Ward 1986). Many bog species are restricted to this habitat. Hillside Bogs of central and western Louisiana usually have yellow pitcher-plant

(*Sarracenia alata*) as a dominant (MacRoberts and MacRoberts 1991).

HERBACEOUS PLANTS: Usually dominated by sedges, grasses and yellow pitcher-plants, but many forb species are present. Major graminoids include Gulf coast muhly (*Muhlenbergia expansa*), tooth-ache grass (*Ctenium aromaticum*), panic grasses (*Panicum rigidulum, P. virgatum*, others; *Dichanthelium* spp.), three-awn grasses (*Aristida palustris, A purpurascens* var. *virgata*), purple silky-scale (*Anthaenantia rufa*), narrow broomsedge (*Andropogon gyrans* var. *stenophyllus*), numerous beaked sedges (*Rhynchospora elliottii, R. gracilenta, R. plumosa, R. rariflora*, others), several yellow-eyed grasses (*Xyris ambigua, X. baldwiniana, X. caroliniana, X. difformis* var. *curtissii, X. torta*, others), bog buttons (*Eriocaulon decangulare, E. texense; Lachnocaulon anceps, L. digynum*), nut-rushes (*Scleria georgiana, S. muhlenbergii*, others), caric-sedge (*Carex glaucescens*), umbrella grasses (*Fuirena bushii, F. squarrosa*, others), and rushes (*Juncus* spp.). Primary forbs include the insectivorous yellow pitcher-plant, meadow-beauties (*Rhexia lutea, R. petiolata*, others), milkworts (*Polygala cruciata, P. ramosa*, others), blazing-star (*Liatris pycnostachya*), Barbara's-buttons (*Marshallia graminifolia* var. *cynanthera*), Yellow sunnybell (*Schoenolirion croceum*), Indian plantain (*Arnoglossum ovatum*), narrow-leaved tickseed (*Coreopsis linifolia*), bog thistle (*Eryngium integrifolium*), justice-weed (*Eupatorium leucolepis*), sun bonnet (*Chaptalia tomentosa*), and spindle-root (*Ludwigia hirtella*). Additional insectivorous plants are sun-dews (*Drosera brevifolia, D. capillaris*), bladder-worts (*Utricularia cornuta, U. juncea, U. subulata*) and butter-wort (*Pinguicula pumila*). Various orchids, especially *Calopogon tuberosus, Pogonia ophioglossoides, Platanthera* spp. and *Spiranthes* spp., are often conspicuous. Club-mosses (*Lycopodium* spp.) often are quite common and sphagnum moss is typically abundant beneath other herb cover.

WOODY PLANTS: The following woody plants readily invade bogs and will come to dominate them without fire: big-leaf gallberry (*Ilex coriacea*), wax-myrtle (*Myrica cerifera*), big-leaf wax-myrtle (*Myrica heterophylla*), red bay (*Persea borbonia*), poison sumac (*Rhus vernix*), possum-haw viburnum (*Viburnum nudum*), baygall blueberry (*Vaccinium fuscatum*), red choke-berry (*Aronia arbutifolia*), hazel-alder (*Alnus serrulata*), laurel green-brier (*Smilax laurifolia*), sweetbay (*Magnolia virginiana*), swamp black gum (*Nyssa biflora*) and red maple (*Acer rubrum*). Longleaf pine (*Pinus palustris*) may be scattered.

FLORISTIC DIVERSITY RATING: High

PETS POTENTIALLY PRESENT:

Burmannia biflora
Calopogon barbatus
Lachnocaulon digynum
Lycopodium cernuum

Platanthera blephariglottis
Platanthera integra
Pteroglossaspis ecristata
Rhynchospora macra
Rudbeckia scabrifolia
Sabatia macrophylla
Xyris drummondii
Xyris scabrifolia
Zigadenus densus

VARIATION:

There are different kinds of Hillside Bogs arising primarily as a result of different seepage regimes. They range from seasonally moist areas along slopes with relatively few bog-associated species, to bogs that are continually wet throughout the year and support a large array of bog-associated species. Often much variation in moisture regime can be observed from one place to another within a bog. The degree of development of a seep in a given area will be primarily dependent on five major characteristics that influence landscape hydrology: 1) upslope surface and subsurface soil characteristics which govern soil infiltration and saturated flow rates, 2) size of the recharge area, 3) vegetation present in both recharge and seepage areas, 4) local topography, and 5) depth, gradient and extent of the underlying impermeable layer (Platt *et al.* 1990).

Hillside Bogs may "flip-flop" over time with Wooded Seeps on the basis of fire history (see discussion under Wooded Seep Dynamics).

ASSOCIATED NATURAL COMMUNITIES:

Upland Longleaf Pine Forest - surrounding
Wooded Seeps - included, downslope or adjacent
Bayhead Swamp - downslope

STATE RARITY:

Less than 2000 acres of relatively intact Hillside Bogs are estimated to be in central and western Louisiana. Much less is present in southeastern Louisiana.

EXTENT ON DISTRICT:

Quite common on the Vernon District.

REMARKS ON OVERALL CURRENT CONDITION ON DISTRICT:

The current extent is believed to be only minimally reduced from presettlement extent. The Vernon District supports more bogs than any other KNF District. Numerous fair to excellent bogs. Most would benefit from more frequent fire, with at least some burns applied in the growing season.

OTHER COMMENTS:

Hillside Bogs of this basic type are endemic to fire-frequented, sandy uplands within the longleaf pine range of the coastal plain of the southeastern U.S. Although most are quite small (< 1 acre), literally hundreds of bogs are present on the Vernon and on nearby Fort Polk Army Installation; such abundance may well represent one of the largest concentrations of Hillside Seepage Bogs in the southeastern U.S.

NATURAL COMMUNITY NAME: Wooded Seep

[Note: This plant community is now designated as Seepage Slope Shrub Thicket by the Louisiana Natural Heritage Program. The name Wooded Seep has been retained here for consistency with the previous reports: Martin and Smith 1991, Martin and Smith 1993]

Synonyms: Seepage Slope Shrub Thicket, Baygall, Green-head, Forested Seep, Acidic Seepage Swamp, Stream-head Pocosin, Spring-head

TOPOGRAPHIC POSITION:

On seepy hillsides of varying degree slope, at streamheads, at the base of seepage slopes, and along narrow drainages, often within, below, or adjacent to Hillside Bogs.

ASSOCIATED SURFACE GEOLOGY:

High Pleistocene Terraces
Fleming, Blounts Creek Member

SOILS:

Deep, poorly drained, very strongly acid loamy fine sand with relatively high organic matter content. Available water capacity is high, surface runoff is very slow to ponded. Inherent fertility is low. The surface layer remains wet year round. May be mapped as Osier. Wooded Seeps form exclusively in uplands that possess sandy to very sandy soils, typically that have an impermeable subsurface layer.

HYDROLOGY: Palustrine, permanently saturated by seepage flow.

APPEARANCE:

This natural community most typically appears as an open-growing mostly evergreen shrubby thicket associated with Hillside Bogs. Wooded Seeps may become forest-like, but still possess numerous shrubs. Individual occurrences are never very extensive, typically less than 1 acre, but they may reach a few acres in size, and may grade gradually downslope or downstream into a Bayhead Swamp.

COMMUNITY DYNAMICS:

The degree of development of Wooded Seeps is dynamically related to fire frequency. Because on the Vernon District the habitat is primarily embedded within what are now or historically were longleaf pine forests, its distribution, extent and structure were controlled to a large degree by growing-season fire events. Wooded Seeps can only develop in areas that do not burn with great frequency or in areas that have been fire suppressed for at least a few years. Hillside Bogs that experience declines in fire frequency may succeed into Wooded Seeps; correspondingly, Wooded Seeps may revert to Hillside Bogs when subjected to increased fire frequency. This "flip-flopping" habitat character probably occurred to some degree in presettlement times. Wooded Seeps supporting larger trees are only in areas with relatively low fire frequency. The soil and hydrological factors that cause Wooded Seeps to arise on hillsides are essentially the same as for Hillside Bogs (see discussion under Hillside Bog Dynamics).

VEGETATION:

In general, very similar to Bayhead Swamp in component woody species.

Overstory: Often absent as a true overstory, but may include sweetbay (*Magnolia virginiana*), swamp black gum (*Nyssa biflora*), American holly (*Ilex opaca*), and red maple (*Acer rubrum*).

Midstory: Always supports numerous shrub species, many evergreen, and may include big-leaf gallberry (*Ilex coriacea*), wax-myrtle (*Myrica cerifera*), big-leaf wax-myrtle (*Myrica heterophylla*), red bay (*Persea borbonia*), hazel alder (*Alnus serrulata*), poison sumac (*Toxicodendron vernix*), baygall blueberry (*Vaccinium fuscatum*), possum-haw viburnum (*Viburnum nudum*), red choke-berry (*Aronia arbutifolia*), Virginia willow (*Itea virginica*), fetterbush (*Lyonia* spp.), summer azalea (*Rhododendron oblongifolium*), and others. Laurel greenbrier (*Smilax laurifolia*) is usually quite conspicuous climbing into and overtopping shrubs and small trees.

Understory: Typically includes a number of ferns, *e.g.* cinnamon fern (*Osmunda cinnamomea*), royal fern (*Osmunda regalis*), net-leaved chain fern (*Woodwardia areolata*), sensitive fern (*Onoclea sensibilis*), and Virginia chain fern (*Woodwardia virginica*). Sphagnum moss beds may be abundant, and other mosses and liverworts may be common. Various herbaceous species characteristic of Hillside Bogs grow in openings, on edges, and suppressed in the understory.

FLORISTIC DIVERSITY RATING: Low to Medium

PETS POTENTIALLY PRESENT:

Mayaca aublettii
Burmannia biflora
Uvularia sessilifolia

Rudbeckia scabrifolia
Other sensitive species associated with Hillside Bogs

VARIATION:

As discussed under Dynamics, Wooded Seeps probably occurred in many cases in some dynamic "flip-flopping" relationship with Hillside Bogs, depending on fire frequency at individual sites. However, Wooded Seeps in forests other than longleaf probably did not flip-flop with Hillside Bogs, but retained some character as an understory wooded seep, again depending on fire history. Wooded Seeps may expand in area and support progressively larger specimens of component woody species with decreasing fire frequency.

ASSOCIATED NATURAL COMMUNITIES:

Hillside Bog - adjacent, surrounding
Bayhead Swamp - downslope
Upland longleaf Pine Forest - upslope, surrounding

STATE RARITY:

Generally uncommon to rare (but locally common) in sandy uplands of southeastern, central, and western Louisiana. Probably most common in western and southeastern Louisiana.

EXTENT ON DISTRICT:

Very common; associated with Hillside Bogs.

REMARKS ON OVERALL CURRENT CONDITION OF DISTRICT:

Probably more common than in presettlement times due to altered fire frequency.

OTHER COMMENTS:

Wooded Seeps (Seepage Slope Shrub Thickets) are very similar to Bayhead Swamps in composition and functional dynamics, but the size and setting of this community sets it apart. Wooded Seeps are almost always small in scale (usually much less than 1 acre in extent) and they always occur as patches on slopes within Hillside

Bogs or as very narrow wooded strips along the upper reaches of small, intermittent creeks.

"Forested Seep" is the term now used by LNHP for shrub-dominated seepage areas within (in the midstory/understory of) various pine-hardwood forests in sandy uplands across the state. They usually are less species-rich and may differ some in composition compared to Wooded Seeps associated with Hillside Seepage Bogs.

NATURAL COMMUNITY NAME: **Bayhead Swamp**

Synonyms: Baygall, Green-head, Acidic Seepage Swamp, Stream-head Pocosin, Spring-head

TOPOGRAPHIC POSITION:

Typically along the upper reaches of small, sandy streams; never on hillsides. Variants of the community can be present in depressional areas within Riparian Forests along small to intermediate streams.

ASSOCIATED SURFACE GEOLOGY:

Holocene alluvium within Pleistocene High Terraces or Blounts Creek Member of the Fleming.

SOILS:

Deep, very poorly drained, very strongly acid loamy fine sand or fine sandy loam, with relatively high organic matter content. Available water capacity is high, surface runoff is very slow to ponded. Inherent fertility is low. The surface layer remains wet or flooded mostly year round.

HYDROLOGY: Palustrine, seasonally to semi-permanently saturated or flooded.

APPEARANCE:

A forested wetland with moderately to densely stocked overstory and often dense midstory/understory of various shrubs, many evergreen. The understory often contains an abundance of ferns, except in the lowest, often-flooded depressions where little herbaceous cover is present. Individual occurrences may be from a few to many acres.

COMMUNITY DYNAMICS:

Although Bayhead Swamps on the Vernon District are predominantly embedded within the historic range of the pyrogenic longleaf pine system, the relationship of Bayhead Swamps to fire is unclear. Fire probably played a minor role in this natural community because of its topographic position, usually wet nature, and apparent lack of appropriate fuels to carry a fire. However, fires may have occurred during exceedingly

dry periods. The overstory may tend to be even-aged because relatively dry conditions conducive to regeneration occur infrequently; however, overstory species will regenerate on exposed root masses, stumps and logs scattered in the swamp. Shrubs and ferns are most abundant in less frequently flooded areas. The highly acidic nature of the soils combined with the abundance of organic muck that accumulates on the swamp floor often produces a "blackwater" (actually tea-colored water) condition in streams associated with Bayhead Swamps.

Most typically, Bayhead Swamps result from the geological and hydrological characteristics of stream headwaters in sandy coastal plain hills. In such areas, relatively little rain water runs off the uplands, rather most penetrates the soil and eventually seeps into the floodplain along the valley wall. This results in constant, relatively high rates of discharge. The stream is unable to incise a single distinct channel at its head, and instead becomes a series of braided channels, with the entire floodplain usually saturated to inundated. However, bayhead-type plant assemblages can arise in depressions within acidic flat terraces/floodplains otherwise occupied by better-drained Mixed Hardwood/Loblolly Pine Forest and/or Riparian Forest.

VEGETATION:

Overstory: Usually totally dominated by sweetbay (*Magnolia virginiana*) and swamp black gum (*Nyssa biflora*), but may contain other species such as red maple (*Acer rubrum*), laurel oak (*Quercus laurifolia*), southern magnolia (*Magnolia grandiflora*), American holly (*Ilex opaca*), loblolly pine (*Pinus taeda*), bald cypress (*Taxodium distichum*) and others.

Midstory: As with Wooded Seeps, usually contains numerous shrubs, many evergreen, including big-leaf gallberry (*Ilex coriacea*), wax-myrtle (*Myrica cerifera*), big-leaf wax-myrtle (*Myrica heterophylla*), red bay (*Persea borbonia*), poison sumac (*Rhus vernix*), possum-haw viburnum (*Viburnum nudum*), baygall blueberry (*Vaccinium fuscatum*), red choke-berry (*Aronia arbutifolia*), hazel-alder (*Alnus serrulata*), Virginia willow (*Itea virginica*), and summer azalea (*Rhododendron oblongifolium*). The vines climbing hydrangea (*Decumaria barbara*) and laurel greenbrier (*Smilax laurifolia*) are often common.

Understory: Typically supports much cover of a number of ferns, *e.g.*, cinnamon fern (*Osmunda cinnamomea*), royal fern (*Osmunda regalis*), net-leaved chain fern (*Woodwardia areolata*), sensitive fern (*Onoclea sensibilis*), and Virginia chain fern (*Woodwardia virginica*). Other herb species are usually sparse but may include, among others, nodding nixie (*Apteria aphylla*), St. John's worts (*Hypericum* spp.), caric sedges (*Carex* spp.), umbrella-sedges (*Cyperus* spp.), and orchids such as *Platanthera clavellata, P. ciliaris and P. cristata.* Sphagnum moss beds may be abundant on the swamp floor, and other mosses and liverworts may be common on exposed root masses, logs, stumps

and tree trunks. Various herbaceous species characteristic of Hillside Bogs occur sporadically on seepy swamp edges subject to periodic fire.

FLORISTIC DIVERSITY RATING: Low to Medium

PETS POTENTIALLY PRESENT:

Prenanthes barbata
Mayaca aublettii
Burmannia biflora
Uvularia sessilifolia
Rudbeckia scabrifolia (on open edges)

VARIATION:

Bayhead Swamps usually grade into Riparian Forests downstream as the stream channel becomes better defined, and at this transition area there is an interesting mix of species from each natural community. Variants of Bayhead Swamps may also occur within depressions on acidic flat terraces supporting Mixed Hardwood-Loblolly Forest or in floodplains otherwise occupied by Riparian Forest.

ASSOCIATED NATURAL COMMUNITIES:

Hillside Bog - upslope
Riparian Forest - downstream; adjacent/surrounding
Wooded Seep - upslope
Mixed Hardwood-Loblolly Forest - upslope; adjacent/surrounding
Upland Longleaf Pine Forest - upslope

STATE RARITY:

Good examples are uncommon to rare in southeastern, western, central and northern Louisiana. Probably most common in western and far southeastern Louisiana.

EXTENT ON DISTRICT:

Common on the Vernon District.

REMARKS ON OVERALL CURRENT CONDITION ON DISTRICT:

Probably comparable to presettlement distribution and composition because the type is not fire-dependent and there has been relatively little past anthropogenic disturbance of this community on the district.

OTHER COMMENTS:

Bayhead Swamps are very similar to Wooded Seeps (Seepage Slope Shrub Thickets) in composition and functional dynamics, but the size and setting of this community sets it apart. Bayhead Swamps are almost always at least a few acres in size and typically occur downstream from Wooded Seeps, at a point where the community becomes swamp-like. Wooded Seeps are almost always small in scale (usually much less than 1 acre in extent) and they always occur as patches on slopes within Hillside Bogs or as very narrow wooded strips along the upper reaches of small, intermittent creeks.

Bayhead Swamps may be referred to locally as "baygalls" and are often referred to in old land surveys as "bay thickets".

NATURAL COMMUNITY NAME: Longleaf Pine Flatwoods/Pine Flatwood Savannah

SYNONYMS: Western Wet/Mesic Longleaf Pine Savannah/Flatwoods, Pine Flatwoods, Pine Savannah

TOPOGRAPHIC POSITION: Flat to gently undulating flatlands.

ASSOCIATED SURFACE GEOLOGY:

On the Vernon District, this community is associated with relatively flat areas of the High Pleistocene Terraces; longleaf pine flatwoods and flatwood savannahs elsewhere in the state more typically arise on the younger Intermediate and Prairie Pleistocene Terraces.

SOILS:

Somewhat poorly drained to poorly drained to very poorly drained, strongly acidic fine sandy loams or silt loams. Soils in lower positions are hydric and are normally saturated in winter, early spring and periodically throughout the growing season, while soils in higher positions are non-hydric and not saturated appreciably during the growing season. Inherent fertility is low. On the Vernon District, the community is chiefly associated with soils mapped as Beauregard fine sandy loam.

HYDROLOGY:

Pine Flatwoods: Terrestrial, mesic to wet-mesic

Flatwood Savannahs: Palustrine, intermittent surface saturation, often for days or weeks at a time.

APPEARANCE:

Where in relatively natural condition, longleaf is the dominant overstory tree, but other pine and hardwood associates may be present, especially where fire has been infrequent. Originally, the community naturally varied from a very dense stocking of longleaf, to very open stocking, depending principally on micro-site moisture regime: more densely stocked in higher/dryer positions (mesic pine flatwoods), more sparsely stocked in lower/wetter positions (savannahs), with gradations between the extremes. In high-quality occurrences, the herbaceous ground cover is a diverse and continuous swath. Hardwoods, shrubs and vines naturally occurred only sporadically within regularly burned

longleaf flatwoods, but have become established under altered fire regimes and are seen more commonly in flatwoods today.

COMMUNITY DYNAMICS:

Frequent light surface fires are essential in perpetuation of this community type, including the rich assortment of herbaceous species in the ground cover. Because longleaf systems are so pyrogenic, the ground cover can be ignited even during relatively high moisture conditions. Natural fires doubtless occurred under these conditions, readily burning through the herbaceous ground cover and highly flammable longleaf needles. The primary season of natural fire is estimated to be late March through June in Louisiana. Fires sweeping through presettlement longleaf systems undoubtedly encountered rain showers, but these did not necessarily preclude their spread. Standing dead trees and fallen logs can provide rain shields and burn for as much as weeks at a time (personal observation), re-igniting the ground cover once it is sufficiently dry. Without fire, open longleaf flatwoods and savannahs are readily invaded by other pines (notably loblolly), as well as many types of hardwoods and shrubs; such invaders will eventually supplant both the rich herb layer and the longleaf pines themselves. The great majority of hardwoods, shrubs, and other pines native to the general area could not tolerate the frequent lightning-generated growing-season ground fires that historically burned over the uplands, and were restricted principally to infrequently burned stream bottoms or wet depressional areas. Frequent fires encouraged a tremendous diversity of herbaceous vegetation to develop in the ground layer.

Dormant-season fires and growing-season fires are fundamentally different in the effect each has on the plant community (See Robbins and Myers 1989). In general, fire stimulates most component herbs to flower and produce seeds. There is most likely a very diverse assemblage of insect species associated with the rich herbaceous layer.

Both historical accounts and recent research indicate clearly that the natural character of longleaf systems is generally uneven-aged, with regenerating even-aged patches of various sizes and ages embedded within the matrix of older trees. Older trees (> 100 years) are usually the best seed producers and individual trees may approach 500 years in age (Platt *et al.* 1988), although most trees die before reaching 300 years (*e.g.*, Mohr 1897, Chapman 1909).

In low, very poorly drained topographic positions, longleaf overstory density was naturally quite low in presettlement times, and often individual trees were very scattered, giving rise to what are called "pine flatwood savannahs". Low tree density in these settings is probably attributable to a number of site and soil characteristics, among them: 1) longleaf regeneration is impeded by frequent floods that preclude seedling establishment in low areas subject to regular flooding or long periods of standing water, 2) high water tables inhibit deep root development, thereby encouraging shallow rooting of longleaf, making it more prone to wind-throw, and 3) wet flatlands are not the ideal

environment for longleaf and trees growing there are probably under stress, making them more susceptible to insect or disease attack.

Mesic, non-flood prone settings in flatwoods may have produced some of the highest stem densities of longleaf pine in presettlement times.

VEGETATION:

Overstory: Where in relatively natural condition and frequently burned, the overstory is almost pure longleaf pine, perhaps with some loblolly pine (*Pinus taeda*). However, other species are often present today due to fire suppression, including black gum (*Nyssa sylvatica*), swamp black gum (*Nyssa biflora*), sweet gum (*Liquidambar styraciflua*), red maple (*Acer rubrum*), sweetbay (*Magnolia virginiana*), and much additional loblolly. Planted slash pine (*Pinus elliottii*) today dominates the great majority of flatwoods on the Vernon District that historically supported longleaf.

Midstory: Depending on topographic position and fire history, some shrubs that may be found include wax myrtle (*Myrica cerifera*), bigleaf wax myrtle (*Myrica heterophylla*), bigleaf gallberry (*Ilex coriacea*), possum-haw viburnum (*Viburnum nudum*), red bay (*Persea palustris*), Elliott's Huckleberry (*Vaccinium elliottii*) and baygall blueberry (*Vaccinium fuscatum*). In fire-suppressed situations, green-briers (*Smilax laurifolia, S. rotundifolia*, others) are often prominent.

Understory: Diverse complement of herbs that varies with soil moisture regime. Dominated by grasses and, in wetter sites, sedges, but numerous forbs present. Wet variants are similar to Hillside Bogs in composition.

Grasses and Sedges: Some prominent taxa include Gulf coast muhly (*Muhlenbergia expansa*), tooth-ache grass (*Ctenium aromaticum*), panic grasses (*Panicum rigidulum, P. virgatum*, others; *Dichanthelium* spp.), three-awn grasses (*Aristida palustris, A purpurascens* var. *virgata*), purple silky-scale (*Anthaenantia rufa*), broomsedges (*Andropogon* spp.), little bluestem (*Schizachyrium scoparium*), numerous beaked sedges (*Rhynchospora* spp.), yellow-eyed grasses (*Xyris* spp.), bog buttons (*Eriocaulon decangulare, E. texense; Lachnocaulon anceps, L. digynum*), nut-rushes (*Scleria georgiana, S. muhlenbergii*, others), and caric-sedges (*Carex* spp.).

Forbs: Primary forbs vary with moisture regime and include meadow-beauties (*Rhexia lutea, R. petiolata*, others), milkworts (*Polygala cruciata, P. ramosa*, others), blazing-star (*Liatris pycnostachya*), Indian plantain (*Arnoglossum ovatum*), brown-eyed susan (*Rudbeckia grandiflora*), narrow-leaved tickseed (*Coreopsis linifolia*), bog thistle (*Eryngium integrifolium*), justice-weed (*Eupatorium leucolepis*), sun bonnet (*Chaptalia tomentosa*), sun-dews (*Drosera brevifolia, D. capillaris*), and bladder-worts (*Utricularia* spp.). Various orchids, especially *Calopogon tuberosus, Pogonia ophioglossoides, Platanthera* spp. and *Spiranthes* spp., may be conspicuous in wetter spots. Club-mosses (*Lycopodium* spp.) and sphagnum moss may be common.

FLORISTIC DIVERSITY RATING: High

PETS POTENTIALLY PRESENT:

Burmannia biflora
Calopogon barbatus
Lachnocaulon digynum
Lycopodium cernuum
Platanthera blephariglottis
Platanthera integra
Pteroglossaspis ecristata
Rhynchospora macra
Rudbeckia scabrifolia
Sabatia macrophylla
Xyris drummondii
Xyris scabrifolia
Zigadenus densus

VARIATION:

As alluded to previously in this account, two closely interdigitated plant communities, one dryer and one wetter, are recognized. Various gradations are possible between the two.

Mesic Longleaf Pine Flatwoods - Typically on broad, slightly convex ridges. The longleaf overstory may be relatively densely stocked. This topographic position probably supported relatively heavily-stocked longleaf forests in presettlement times. The ground cover in this variant is dominated by facultative upland and obligate upland grasses and forbs, with relatively few sedges, and few facultative wetland or obligate wetland species.

Wet Longleaf Pine Savannahs - Typically on very poorly drained flats and broad shallow concave swales. Longleaf pine was naturally sparsely to very sparsely stocked in these positions (see Dynamics section). Where intact, the ground cover is dominated by sedges, grasses and forbs, the majority of which are facultative/obligate wetland species.

ASSOCIATED NATURAL COMMUNITIES:

Riparian Forest - downslope
Wooded Seep - downslope, embedded
Bayhead Swamp - downslope
Upland Longleaf Pine Forest - upslope

STATE RARITY:

High-quality examples that approximate presettlement composition are uncommon to rare in the west Gulf coastal plain and are becoming scarcer as many of those remaining are undergoing habitat alteration.

EXTENT ON DISTRICT:

Formerly quite extensive in the southwestern and eastern portions of the district. The vast majority of these former longleaf flatwoods were planted with slash pine plantations in the 1930's. Very few longleaf flatwoods/savannahs remain on the district.

REMARKS ON OVERALL CURRENT CONDITION ON DISTRICT:

Although essentially all former longleaf flatwoods/savannahs were converted to slash pine plantations decades ago on the Vernon District, much of the area continues to support fairly high-quality ground cover communities. Longleaf flatwoods/savannahs could be restored in much of this area relatively easily.

OTHER COMMENTS:

Wherever poorly drained soils, minimal topographic relief and frequent fires combine, longleaf flatwoods are likely. Pine flatwoods-type species may be locally prevalent in patches within otherwise typical upland longleaf forest where drainage is poor (*e.g.*, isolated depressions).

NATURAL COMMUNITY NAME: Riparian Forest

[Note: This plant community is now designated as Small Stream Forest by the Louisiana Natural Heritage Program. The name Riparian Forest has been retained here for consistency with the previous reports: Martin and Smith 1991, Martin and Smith 1993]

Synonyms: Small Stream Forest, Coastal Plain Small Stream Swamp Forest

TOPOGRAPHIC POSITION:

In the average annual floodplain of permanent small to intermediate-sized streams.

ASSOCIATED SURFACE GEOLOGY:

Holocene Alluvium within High Pleistocene Terraces or Blounts Creek Member of Fleming Formation.

SOILS:

Because Riparian Forests state-wide are associated with any geological formation, the percentage of sand, silt, calcareous clay, acidic clay and organic material in the soil is highly variable. Riparian Forests on the Vernon District are predominantly on acidic fine sandy loams and silty loams. Although most soils in the floodplain are hydric, non-hydric soils are often included in higher positions (*e.g.*, on knolls). Guyton is the typical soil series.

HYDROLOGY: Palustrine wetland, annually flooded for brief periods, on the order of 5-10 days per year, but rarely more than 2 days at a time. Most flood events occur in the winter and spring.

APPEARANCE:

A relatively narrow, small stream floodplain forest, moderately to densely stocked with hardwoods, often with much loblolly pine. The forests vary in width depending principally on the size of the associated stream. In relatively undisturbed Riparian Forests, older specimens of component tree species may be large (2-5 feet dbh). The forest tends to be uneven-aged and canopy gaps and snags may be scattered. Where large trees form a closed canopy, an open, park-like understory often develops, with

relatively few shrubs or regenerating trees present; however, shade-tolerant shrubs and trees are common. Where the canopy is not closed, a fairly dense midstory and understory of shrubs, trees, and vines usually forms. Except for scattered stands of giant cane (*Arundinaria gigantea*), the understory vegetative cover is often minimal, with low percent plant cover, and much litter-covered or exposed soil.

COMMUNITY DYNAMICS:

Riparian Forests are characterized by a mixture of long-lived canopy species, such as beech (150-300 years, Glitzenstein *et al.* 1986) and southern magnolia (150-250 years; Platt and Hermann 1986), and shorter-lived gap colonizers, such as loblolly pine (80-130 years, Mohr 1897) and water oak (50-150 years, Platt and Hermann 1986). Similarly, the midstory contains shade-tolerant species, such as American holly (*Ilex opaca*), as well as gap colonizers such as dogwood (*Cornus florida*) and silverbell (*Halesia diptera*). Even in areas not subject to frequent catastrophic windthrow, gaps comprise 1-5% of mature natural forests, allowing gap-colonizing species to persist (Runkle 1982). This combination of life histories produces a structurally diverse forest, both horizontally and vertically. Heavily shaded areas with old trees and little ground cover interdigitate with sunlit sapling thickets.

The major factors that naturally control Riparian Forest community dynamics include: 1) frequency, duration, depth and timing of flooding, 2) windstorms, diseases, and insects, 3) individual tree mortality from old age, 4) sediment deposition, and 5) beavers. Although averages may be calculated for annual flood characteristics, the characteristics are very dynamic and may vary considerably from year to year. For example, a reduction in flood frequency, duration, or depth, contingent upon timing of floods, could result in increased regeneration of various plant species from all strata and invasion of the area by species not already present. However, a significant increase in these flood parameters could interrupt regeneration of many species established in the understory.

As with all forests, windstorms play a significant role in the dynamics of Riparian Forests. In general, catastrophic "blowdown" areas tend to regenerate even-aged from seedlings, saplings, and root sprouts, but such devastating blowdowns probably are so infrequent that most of the forest tends to be uneven-aged. Less intense windstorms, which blow down only a percentage of trees of various ages, are much more frequent.

Considered together, disease and insects probably have greater effect on certain individuals or species rather than all or most individuals or species in a given area. However, at times outbreaks of particular insects and/or diseases may affect most individuals in an area. The populations of most insect and disease organisms are episodic.

The death of individual or small groups of trees from old age and concurrent

insect and/or disease attack is perhaps the most important phenomenon that provides canopy openings for overstory and midstory species, especially shade-intolerant ones, to regenerate in mature, natural Riparian Forests. This functional mechanism facilitates an uneven-aged forest condition.

Fire is believed to have played a minor role in the dynamics of this community. Fires are infrequent in Riparian Forests due to their topographic position, chronically wet nature, and lack of appropriate fuels. Fires can occur during exceptionally dry periods, but tend to be low-intensity, smoldering fires, that creep through the leaf litter. However, beech and some other hardwoods of these forests are very fire-tender, and even low-intensity fires may contribute to the formation of canopy gaps.

VEGETATION:

Overstory: Often quite similar to species in forests just above the floodplain. Riparian Forests of the Vernon District may support a diverse variety of hardwoods including white oak (*Quercus alba*), cow oak (*Q. michauxii*), water oak (*Q. nigra*), laurel oak (*Q. laurifolia*), cherrybark oak (*Q. pagoda*), willow oak (*Q. phellos*), beech (*Fagus grandifolia*), southern magnolia (*Magnolia grandiflora*), sweetbay (*Magnolia virginiana*), black gum (*Nyssa sylvatica*), swamp black gum (*Nyssa biflora*), sweet gum (*Liquidambar styraciflua*), sycamore (*Platanus occidentalis*), red maple (*Acer rubrum*), American holly (*Ilex opaca*), river birch (*Betula nigra*), winged elm (*Ulmus alata*), water ash (*Fraxinus caroliniana*), pignut hickory (*Carya glabra*), bitternut hickory (*Carya cordiformis*), basswood (*Tilia caroliniana*), tulip tree (*Liriodendron tulipifera*), red mulberry (*Morus rubra*), and others. The forest in natural condition contains loblolly pine as a primary associate. The epiphytes mistletoe (*Phoradendron* spp.), spanish moss (*Tillandsia usneoides*), and resurrection fern (*Polypodium polypodioides*) may be common on hardwoods in the forest.

Midstory: Often quite similar to species in forests just above the floodplain. Includes regenerating overstory species, and supports a variety of small trees and shrubs, including ironwood (*Carpinus caroliniana*), hophornbeam (*Ostrya virginiana*), huckleberries (*Vaccinium* spp.), big-leaf gallberry (*Ilex coriacea*), paw-paw (*Asimina triloba*), arrow-wood (*Viburnum dentatum*), Virginia Willow (*Itea virginica*), button-bush (*Cephalanthus occidentalis*), little-leaf snowbell (*Styrax americana*), big-leaf snowbell (*S. grandifolia*), silverbell (*Halesia diptera*), wild azalea (*Rhododendron canescens*), sweetleaf (*Symplocos tinctoria*), fringe-tree (*Chionanthus virginicus*), parsley haw (*Crataegus marshallii*), hawthorns (*Crataegus* spp.), deciduous holly (*Ilex decidua*), elderberry (*Sambucus canadensis*), and others.

Vines are often prominent and may include greenbriers (*Smilax* spp.), rattan (*Berchemia scandens*), wild grapes (*Vitis* spp.), trumpet creeper (*Campsis radicans*), poison ivy (*Toxicodendron radicans*), cross-vine (*Bignonia capreolata*), climbing dogbane

(*Trachelospermum difforme*), Virginia creeper (*Parthenocissus quinquefolia*), and climbing hydrangea (*Decumaria barbara*). The non-native vine Japanese honeysuckle (*Lonicera japonica*) is often a serious pest.

Understory: Often minimal herbaceous cover because of flooding and canopy shade, but may support a broad diversity of species. Patches of giant cane (*Arundinaria gigantea*) are usually common. The forest may include species from adjacent non-flooded or rarely-flooded forests, especially near the annual flooded/non-flooded boundary, and on elevated areas within the flood zone. Herb species encountered may include meadow spikemoss (*Selaginella apoda*), lady fern (*Athyrium felix-femina*), net-leaved chain fern (*Woodwardia areolata*), sensitive fern (*Onoclea sensibilis*), broad beech fern (*Thelypteris hexagonoptera*), inland sea-oats (*Chasmanthium latifolium*), spangle grasses (*Chasmanthium* spp.), lizard's-tail (*Saururus cernuus*), jack-in-the-pulpit (*Arisaema triphyllum*), partridge-berry (*Mitchella repens*), St. John's worts (*Hypericum* spp.), cardinal-flower (*Lobelia cardinalis*), lance-leaved water-willow (*Justicia ovata var. lanceolata*), bugle-weed (*Lycopus virginicus*), panic grasses (*Panicum* spp.), umbrella-sedges (*Cyperus* spp.), caric-sedges (*Carex* spp.), rushes (*Juncus* spp.), false-nettle (*Boehmeria cylindrica*), water-primroses (*Ludwigia* spp.), smartweeds (*Polygonum* spp.), and a variety of others. The community usually supports a rich epiphytic constituent of mosses, lichens, and liverworts. Many of these probably are habitat/site specific but relatively little is known about the ecology of most.

FLORISTIC DIVERSITY RATING: Medium-High

PETS POTENTIALLY PRESENT:

Carex hyalina
Triphora trianthophora
Cypripedium kentuckiense
Prenanthes barbata
Amsonia ludoviciana
Xanthorhiza simplicissima

VARIATION:

Three basic variants of Riparian Forests have been recognized thus far by LNHP state-wide: acidic variant, calcareous variant, and downstream variant. All Riparian Forests on the Vernon District are acidic variants.

In acidic, sandy soil areas such as the Vernon District, Riparian Forests usually grade upstream into Bayhead Swamps where an intermixing of species characteristic of each community is found at the ecotonal zone.

Some Riparian Forests on the Vernon have Bayhead Swamp-like areas embedded within them in broad, shallowly ponded depressions away from the stream channel

ASSOCIATED NATURAL COMMUNITIES:

Bayhead Swamp - upstream, adjacent/included
Bottomland Forest - downstream
Mixed Hardwood-Loblolly Forest - upslope, upstream
Upland Longleaf Pine Forest - upslope

STATE RARITY:

While Riparian Forests are not rare within the uplands of Louisiana, many have been significantly altered by anthropogenic disturbance. Mature examples (dominant trees much beyond sexual maturity) are uncommon to rare in most of the state and are becoming progressively rarer as remaining ones are cut-over.

EXTENT ON DISTRICT:

The presettlement extent must correspond closely to the current extent on the district, although old-growth has been greatly reduced.

REMARKS ON OVERALL CURRENT CONDITION ON DISTRICT:

Few untouched examples remain. Most have had some loblolly pine selectively removed and some have been heavily cut-over in the last 20 years. However, most retain relatively natural species composition.

NATURAL COMMUNITY NAME: **Mixed Hardwood-Loblolly Forest**

Synonyms: Mixed Pine-Hardwood Forest (in part)

TOPOGRAPHIC POSITION:

Commonly at the upper, intermittent reaches of small streams and on middle and lower slopes between uplands and stream bottoms. Also may occur on ridges and upper slopes in areas topographically isolated from fire-prone uplands, but this setting was not observed on the Vernon.

ASSOCIATED SURFACE GEOLOGY:

Fleming, Blounts Creek Member
High Pleistocene Terraces

SOILS:

Exclusively on acidic soils of almost any texture

HYDROLOGY: Terrestrial, dry to wet-mesic

APPEARANCE:

A highly variable community. In mature and relatively natural condition, Mixed Hardwood-Loblolly Forests are mostly uneven-aged and moderately to densely stocked with various hardwoods, with loblolly pine as a primary associate. Loblolly can be the canopy dominant in stands that have experienced "blowdowns" within the last several decades. Older specimens of component species may be large (2-3 feet dbh). Canopy gaps and snags may be scattered. Where overstory trees form a closed canopy, an open, park-like understory often develops with relatively few shrubs and regenerating trees present. However, a variety of shrubs and small trees are often present. The cover of understory herbaceous plants is usually sparse. Downed woody material in the form of fallen logs and limbs is often conspicuous on the forest floor and hardwood leaf litter forms a thick carpet in practically all cases.

COMMUNITY DYNAMICS:

Because of their topographic location and inherent composition, Mixed Hardwood-Loblolly Forests have low pyrogenicity, and under natural conditions probably burned only occasionally, and then principally due to their proximity to fire-prone uplands (*e.g.*, longleaf pine). However, occasional sweeping fires, particularly during unusually dry times, may have been important in controlling their composition. When fires occur in these forests, they tend to be of low intensity due to non-conducive fuels and fuel structure, and behave as smoldering ground fires. Very fire-sensitive species, such as beech, can be killed by such fires.

Mixed Hardwood-Loblolly Forests with greater topographic exposure (such as at the upper reaches of intermittent streams or at upper slope positions) experience relatively numerous fires, and often have considerable shortleaf pine, post oak, southern red oak, and mockernut hickory, while generally lacking beech, sweet gum, and American holly. In fact, this upper slope zone may arguably be called a "shortleaf pine/oak-hickory forest", but loblolly is often at least co-dominant with shortleaf here. More protected areas (such as in lower slope positions) closely resemble Riparian forests in their woody composition, although understory shrubs such as witch-hazel are usually more common than in Riparian Forests. These compositional patterns may be partially a function of soil nutrient status and moisture regime across topographic gradients (soil nutrients and soil moisture generally increasing downslope).

Loblolly is typically a rather short-lived (80-130 years), fast-growing pine (although a former National Champion in north Louisiana was 176 years old at death; Donald Baker, personal communication 1991). It survives in closed-canopy forests by regularly producing an abundance of widely-dispersed seeds and quickly colonizing tree-fall gaps. Natural mortality in the canopy occurs often enough to allow loblolly to persist; large-scale blowdowns may regenerate into successional stands dominated by loblolly pine.

The accumulation of downed woody material (*e.g.* fallen logs, limbs) on the forest floor provides exceedingly important micro-habitats for many invertebrate animals and fungi that inhabit the forest. Logs also furnish refugia for small vertebrate animals, such as salamanders, and serve as germination sites for several plant species. Snags created by the death of overstory trees provide critical micro-habitats for many invertebrates and fungi, and eventually drop to the ground as fallen logs. Leaf litter accumulates on the forest floor and forms a thick decaying leaf layer ("leaf mold") that supports a very rich assemblage of invertebrate animals, fungi, and bacteria. This community of inconspicuous organisms acts to decompose leaf litter and downed woody material and facilitate recycling of forest nutrients.

Although mature hardwood-dominated forests support relatively few herbaceous plant species, mesic, hardwood-dominated forests with closed canopies create special understory conditions that seem necessary for many herbaceous "rich woods" species to be present. Those conditions include: 1) much reduced to absent direct sunlight, but

much diffuse light, 2) modified ambient air temperature (reduced on warm/hot days), 3) increased ambient relative humidity, 4) reduced direct physical effects of wind and rain, and 5) a deep, actively decaying leaf litter layer that produces a fertile, humus-rich topsoil.

As with all forests, windstorms play a significant role in the dynamics of this forest. In general, catastrophic "blowdown" areas tend to regenerate even-aged from seedlings, saplings, and root sprouts, but such devastating blowdowns probably are so infrequent that, left to its own devices, most of the forest would tend to be uneven-aged. Less intense windstorms, which blow down only a percentage of trees of various ages, are much more frequent. Loblolly can be the canopy dominant in stands that have experienced "blowdowns" within the last several decades.

Considered together, disease and insects probably have a greater effect on certain individuals or taxonomic groups rather than all or most individuals or species in a given area. However, at times outbreaks of particular insects and/or disease may affect many individuals of many species in an area. The populations of most insect and disease organisms are episodic.

The death of an individual or small groups of trees from old age and concurrent insect and/or disease attack is perhaps the most important phenomenon that provides canopy openings for overstory and midstory species, especially shade-intolerant ones, to regenerate in mature natural Mixed Hardwood-Loblolly Forests. This functional mechanism facilitates an uneven-aged forest condition. Loblolly pine is shorter-lived than many other canopy dominants (*e.g*, white oak=100-250 years, beech=150-300 years) and colonizes gaps quickly.

VEGETATION:

Overstory: Usually quite diverse in species. Some commonly observed species on the Vernon District include White Oak (*Quercus alba*), loblolly pine (*Pinus taeda*), beech (*Fagus grandifolia*), southern red oak (*Q. falcata*), post oak (*Q. stellata*), shortleaf pine (*Pinus echinata*), southern magnolia (*Magnolia grandiflora*), cow oak (*Q. michauxii*), black oak (*Q. velutina*), water oak (*Q. nigra*), laurel oak (*Q. laurifolia*), cherrybark oak (*Q. pagoda*), blackjack oak (*Q. marilandica*), American holly (*Ilex opaca*), red maple (*Acer rubrum*), sweetgum (*Liquidambar styraciflua*), blackgum (*Nyssa sylvatica*), mockernut hickory (*Carya tomentosa*), black hickory (*C. texana*), winged elm (*Ulmus alata*) and others. The epiphytes mistletoe (*Phoradendron* spp.), spanish moss (*Tillandsia usneoides*), and resurrection fern (*Polypodium polypodioides*) may be common on hardwoods in the forest.

Midstory: In addition to regenerating overstory species, the community may contain a variety of shrub species, such as ironwood (*Carpinus caroliniana*), hophornbeam (*Ostrya virginiana*), flowering dogwood (*Cornus florida*), bigleaf snowbell (*Styrax*

grandifolia), witch-hazel (*Hamamelis virginiana*), strawberry bush (*Euonomys americana*), arrow-wood (*Viburnum dentatum*), huckleberries (*Vaccinium* spp., including *arboreum*, *elliottii, and virgatum*), sweet-leaf (*Symplocos tinctoria*), fringe-tree (*Chionanthus virginicus*), parsley haw (*Crataegus marshallii*), other hawthorns (*Crataegus* spp.), downy service-berry (*Amelanchier arborea*), wild azalea (*Rhododendron canescens*), French mulberry (*Callicarpa americana*), red coral bean (*Erythrina herbacea*), and others. Vines commonly present include wild grapes (*Vitis* spp.), greenbriers (*Smilax* spp.), Virginia creeper (*Parthenocissus quinquefolia*), poison ivy (*Toxicodendron radicans*), rattan (*Berchemia scandens*), climbing hydrangea (*Decumaria barbara*), and coral honeysuckle (*Lonicera sempervirens*).

Understory: In addition to regenerating overstory and midstory species, usually supports a variety of herbaceous species, but ground cover is typically sparse. Some species that may occur include Christmas fern (*Polystichum acrostichoides*), lady fern (*Athyrium felix-femina*), broad beech fern (*Thelypteris hexagonoptera*), grape-ferns (*Botrychium* spp.), Indian pink (*Spigelia marilandica*), goldenrods (*Solidago* spp.), daisy fleabane (*Erigeron pulchellus*), beech-drops (*Epifagus virginiana*), violets (*Viola* spp.), woods bedstraw (*Galium circaezans*), woods vetch (*Vicia alba*), woods beggar-tick (*Desmodium nudiflorum*), snake-roots (*Sanicula* spp.), Jack-in-the-pulpit (*Arisaema triphyllum*), partridge-berry (*Mitchella repens*), wake-robbins (*Trillium* spp.), may-apple (*Podophyllum peltatum*), Dutchman's pipes (*Aristolochia* spp.), woods phlox (*Phlox divaricata*), cranefly orchid (*Tipularia discolor*), spangle-grasses (*Chasmanthium* spp.), melic grass (*Melica mutica*), and others.

There is usually a rich assemblage of lichens, mosses, and liverworts on soil, fallen logs, stumps, shrubs and trees. Many of these probably are habitat or site-specific but relatively little is known about the ecology of most.

FLORISTIC DIVERSITY RATING: Medium

PETS POTENTIALLY PRESENT:

Xanthorhiza simplicissima
Hexalectris spicata

VARIATION:

This forest community is variable in composition and percent cover of component species, depending on topographic position, slope, and consequent moisture and fire regime. Of the three variants described previously (Martin and Smith 1993), only the lower slope variant is found on the Vernon District. In many areas, particularly where longleaf pine is dominant on ridgetops and upper slopes, a zone of hardwood-dominated

forest occurs downslope before the stream bottom is reached. This forest type also is found along intermittent creeks. It is a dry-mesic to mesic (rarely wet-mesic) forest, usually heavily shaded, and often containing many "rich woods" species, (*e.g.*,Jack-in-the-pulpit, May-apple, and Christmas fern). Loblolly pine is usually common in these areas, but the canopy is usually dominated by oaks (especially water oak and white oak), sweetgum, blackgum and beech. Southern magnolia is often scattered and flowering dogwood is a typical shrub.

Although at times superficially similar to riparian forests, lower slope Mixed Hardwood-Loblolly Forests generally have much lower densities of beech, sweetgum, and magnolia than typical riparian forests, and much higher densities of post oak, southern red oak, and dogwood. They also tend to have a greater abundance of both loblolly and shortleaf pines, and may be characterized as loblolly/oak/dogwood.

ASSOCIATED NATURAL COMMUNITIES:

Riparian Forest - downslope
Upland Longleaf Pine Forest - upslope

STATE RARITY:

Probably formerly quite common in Louisiana, but mature (dominant trees much beyond sexual maturity), relatively undisturbed occurrences are uncommon to rare statewide today and are becoming progressively rarer as remaining natural forests are cut-over and undergoing forest type conversion.

EXTENT ON DISTRICT:

Not extensive. Limited to lower slopes above Riparian Forests and along some intermittent creek bottoms.

REMARKS ON OVERALL CURRENT CONDITION ON DISTRICT:

Most examples of this forest community are immature on the Vernon. Much of this forest type has been heavily timbered and is characterized by a very thick midstory with many young trees.

NATURAL COMMUNITY NAME: Upland Longleaf Pine Forest, Western Gulf Coastal Plain

SYNONYMS: Western Upland Longleaf Pine Forest, Longleaf Pine Savannah, Longleaf Pine Woodland

TOPOGRAPHIC POSITION:

Dry-mesic to xeric, rolling to gently rolling hills

ASSOCIATED SURFACE GEOLOGY:

High Pleistocene Terraces
Fleming, Blounts Creek Member

SOILS: Acidic sandy loams, loamy sands and sands

HYDROLOGY: Terrestrial, xeric to dry-mesic

APPEARANCE:

Where in relatively natural condition and regularly burned, upland longleaf forests are almost pure stands, open in aspect, typically with long scenic vistas, broken only by hardwood-lined creek and river bottoms and wet depressions. The forest is uneven-aged and stocked with variable-sized longleaf pine; small patches of juvenile pines are usually conspicuously scattered within the forest. The density of longleaf trees is naturally variable within stands and also varies with local conditions and site history, some areas supporting relatively dense growths, others much more open growth. Hardwoods and shrubs naturally occurred only sporadically within regularly burned longleaf forests, but many have become established under altered fire regimes and are seen more commonly in today's forests. Deliberate retention of hardwoods for wildlife purposes has also increased the hardwood component in these forests. In high-quality occurrences, the herbaceous ground cover is present as a diverse and continuous swath of native grasses and forbs, with few weeds.

COMMUNITY DYNAMICS:

Unquestionably, frequent fires are essential in perpetuation of this community type, including the rich assortment of herbaceous plants associated with the ground

cover. The primary season of natural fire in Louisiana is correlated with early growing-season thunderstorms and occurs in late March through June, with May and June probably the peak months (Dr. William Platt, pers. comm. 1990). The natural fire frequency of longleaf forests has been estimated to be once every 1-5 years (Chapman 1932a,b; Heyward 1939; Christensen 1981). Because it is so pyrogenic, the ground cover of longleaf forests can be ignited even during relatively high moisture conditions at any time of the year. Fires sweeping through presettlement longleaf forests undoubtedly encountered rain showers, but these did not necessarily preclude their spread. Standing dead trees and fallen logs can provide rain shields and burn for days, even weeks, at a time (David Martin, Latimore Smith, pers. obs.), re-igniting the ground cover once it is sufficiently dry.

Without fire, open longleaf forests are readily invaded by other pines (notably loblolly and shortleaf), as well as many types of hardwoods and shrubs, which eventually will supplant both the rich herb layer and the longleaf pines themselves. The great majority of hardwoods, shrubs and other pines native to the general area could not tolerate the frequent lightning-generated, growing-season, surface fires that historically burned over the longleaf uplands, and were restricted principally to less frequently burned or fire-free zones of slopes, isolated topographic "islands" (*e.g.*, a hill surrounded by streams), stream bottoms, or wet depressional areas. A few species of hardwoods (particularly oaks) endured the frequent fires, but were largely confined to the ground cover as continually resprouting stems; infrequently, a stem would escape to the canopy. It appears that annual or almost annual summer fires over long periods are necessary to kill all or most hardwoods and shrubs that encroach into longleaf forests (Waldrop *et al.* 1992).

Longleaf naturally existed in virtually pure stands, but did occur in mixed forests at transition zones to other types (Wahlenberg 1946). Such mixed transition zones were typically quite narrow and often abrupt. Several ecological factors combine to account for the fact that longleaf existed almost exclusively in pure forests and seldom in mixed stands. Longleaf pine is exceedingly shade- and competition-intolerant and has very limited seed dispersal ability (Wahlenberg 1946), therefore, it requires very open forests to successfully regenerate and perpetuate itself in a stand. Such open forests were naturally maintained by frequent fire which largely prevented other woody plants from entering the midstory and overstory. Mixed forests containing longleaf pine were present in areas of relatively low fire frequency that were very near large bodies of pure longleaf forest. With a substantial and steady seed source nearby, longleaf could sporadically establish in rare long-lived openings in otherwise relatively dense-canopied mixed forests.

Frequent fires, combined with the open aspect of longleaf forests, encouraged a tremendous diversity of herbaceous vegetation, very prairie-like in composition, to develop in the ground layer. Dormant-season and growing-season fires are fundamentally different in the effect each has on the plant community (see Robbins and

Myers 1989). In general, fire stimulates most component herbs to flower and produce seeds, but fires at different seasons have dissimilar effects in this regard. There is most likely a very diverse assemblage of insect species associated with the rich herbaceous layer. As a broad generalization, one may estimate that there are 10 times as many insect species as plant species in a habitat (Dr. Dorothy Pashley, LSU, personal communication).

Both historical accounts and recent research demonstrate clearly that the prevailing natural character of longleaf systems is generally uneven-aged, with regenerating even-aged patches (each typically only a few hundred square feet in area) of various ages embedded within the matrix of older trees (Schwarz 1907, Chapman 1909, Platt *et al.* 1988). Older trees (>100 years) are usually the best seed producers and individual trees may approach 500 years in age.

A comparison of early observations in virgin forests (Mohr 1897, Schwarz 1907, Chapman 1909) to a modern-day study in an old-growth stand (Platt *et al.* 1988) indicates that natural longleaf forests in western Louisiana and eastern Texas were more dense than those in the eastern coastal plain, perhaps due to higher densities of young adults. Schwarz (1907) found densities of adults in the flatwoods of southwestern Louisiana to vary from 29 to 70 stems per acre, considerably higher than the 18 stems per acre on average found in old-growth longleaf in southern Georgia (Platt *et al.* 1988). Chapman (1909) and Mohr (1897) found densities of longleaf in uplands in east Texas and west Louisiana ranging from 32 to 72 adults per acre. However, basal areas between the two regions appears more comparable: 60 to 90 square feet per acre for eastern Texas and western Louisiana *versus* 40 to 60 square feet per acre for southern Georgia; perhaps because most of the difference in density between East and West Gulf Coastal Plain longleaf forests may have been due to smaller trees.

Because longleaf pine is a "masting" species producing heavy seed crops in general only once every several years (Platt *et al.* 1988), it tends to reproduce in pulses, and what may be termed "good regeneration" may only occur after a heavy mast year. Because its seeds are relatively heavy, longleaf in general disperses its seeds poorly compared to other native pines.

Natural mortality of adult longleaf pines occurs primarily from lightning and windthrow. Both processes take primarily old trees (150+ years), the mortality rate increasing with age (Platt *et al.* 1988).

As with all forests, windstorms play a significant role in the dynamics of this forest. In general, catastrophic "blowdown" areas tend to regenerate even-aged from seedlings and saplings, but such devastating blowdowns probably are infrequent. Less intense windstorms, which blow down only a percentage of trees of various ages, are much more frequent. Over time, the majority of the forest would tend to be uneven-aged.

Longleaf pine is generally less prone to disease and insect attack than other pines

(Boyer 1991). Its major disease is brown-spot needle blight (*Scirrhia acicola*), a pathogenic agent that affects grass-stage seedlings almost exclusively, and one which is controlled by frequent fire. Pine beetles (*Dendroctonus* spp., *Ipps* spp.) are usually not a severe pest of longleaf.

VEGETATION:

Overstory: Where in relatively natural conditions and frequently burned, the forest is almost pure longleaf pine. However, there is often a variety of other species scattered in the forest today due to altered fire regimes of the last several decades. Although some of these were present in presettlement longleaf forests in very low numbers, their numbers have increased, while other fire-sensitive species have encroached in many places. Tree species present today may include loblolly pine (*Pinus taeda*), shortleaf pine (*Pinus echinata*), post oak (*Quercus stellata*), southern red oak (*Q. falcata*), blackjack oak (*Q. marilandica*), bluejack oak (*Q. incana*), water oak (*Q. nigra*), mockernut hickory (*Carya tomentosa*), black hickory (*C. texana*), sweetgum (*Liquidambar styraciflua*), blackgum (*Nyssa sylvatica*), black cherry (*Prunus serotina*), and others.

Midstory: Primary shrubs that may be found include flowering dogwood (*Cornus florida*), yaupon (*Ilex vomitoria*), huckleberries (*Vaccinium* spp., including *arboreum, elliottii, amoenum, and stamineum*), French mulberry (*Callicarpa americana*), wax-myrtle (*Myrica cerifera*), and winged sumac (*Rhus copallina*).

Understory: Very rich, dominated by grasses, composites, legumes, and a wide assortment of forbs.

Grasses: Usually dominated by little bluestem (*Schizachyrium scoparium*) and broomsedges (*Andropogon* spp., including *gerardii, virginicus, ternarius, and gyrans*), but other primary grasses include slender bluestem (*S. tenerum*), Indian grass (*Sorghastrum nutans*), three-awn grasses (*Aristida* spp.), love grasses (*Eragrostis* spp.), panic grasses (*Dichanthelium* spp., *Panicum* spp.), Florida paspalum (*Paspalum floridanum*), dropseeds (*Sporobolus* spp.), skeleton grass (*Gymnopogon ambiguus*), and bristle grasses (*Setaria* spp.).

Composites: Includes several asters (*Aster* spp.), sunflowers (*Helianthus* spp., especially *H. angustifolius*) golden asters (*Heterotheca* spp.), silk-grass (*Pityopsis graminifolia*), elephant's foot (*Elephantopus* spp.), thorough-worts (*Eupatorium* spp.), rabbit-tobaccos (*Gnaphalium* spp.), lance-leaved tickseed (*Coreopsis lanceolata*), western pale coneflower (*Echinacea sanguinea*), brown-eyed susans (*Rudbeckia* spp.), blazing-stars (*Liatris* spp.), rosin weeds (*Silphium* spp.), goldenrods (*Solidago* spp.), ironweeds (*Vernonia* spp.), and others.

Legumes: Prominent legumes usually include beggar-ticks (*Desmodium* spp.), bush clovers (*Lespedeza* spp.), wild indigo (*Baptisia* spp.), partridge-peas (*Cassia* spp.), hoary peas (*Tephrosia* spp.), rattle pods (*Crotalaria* spp.), pencil-

flower (*Stylosanthes biflora*), snout-beans (*Rhynchosia* spp.), butterfly pea (*Centrosema virginiana*), and milk peas (*Galactia* spp.).

Others: Additional frequent forbs on the Vernon District include rose-gentian (*Sabatia* spp.), evening primroses (*Oenothera* spp.), wild petunias (*Ruellia* spp.), milk-worts (*Polygala* spp.), butterfly-weed (*Asclepias tuberosa*), milkweeds (*Asclepias* spp.), blue sage (*Salvia azurea*), star-grass (*Hypoxis* spp.), pine lily (*Alophia drummondii*), downy phlox (*Phlox pilosa*), false foxgloves (*Agalinis* spp.), meadow beauties (*Rhexia* spp.), flowering spurge (*Euphorbia corollata*), and others. Bracken fern (*Pteridium aquilinum*) is often conspicuous in large colonies. Fruticose ground lichens may be common in dryer areas.

FLORISTIC DIVERSITY RATING: High to Very High

PETS POTENTIALLY PRESENT:

Cyperus grayioides
Liatris tenuis
Pteroglossaspis (Eulophia) ecristata
Selaginella riddellii
Tetragonotheca ludoviciana

VARIATION:

There are distinct variants of Upland Longleaf Pine Forest, depending primarily on topographic setting, associated geology, and the soils that are present in an area. In general the variants grade from xeric types on hilly topography with very well-drained deep sands; to dry and dry-mesic types on gently rolling to fairly dissected topography and well-drained sandy loams; to (dry-)mesic types on gently rolling topography and fine sandy loams and silt loams. In each of these basic variants there are distinct assemblages of associated plant species in the ground cover, apparently as a result of associated soil moisture and nutrient regimes.

ASSOCIATED NATURAL COMMUNITIES:

Hillside Seepage Bog - included, downslope
Seepage Slope Shrub Thicket - included, downslope
Mixed-Hardwood/Loblolly Pine Forest - downslope
Bayhead Swamp - downslope

STATE RARITY:

Although Upland Longleaf Pine Forests are not actually rare as a habitat type west of the Mississippi River, high quality examples are fairly rare and becoming rarer, especially on private lands where the near-exclusive trend has been to replace longleaf with loblolly or slash pine (*Pinus elliottii*) plantations. The acreage of longleaf pine forest west of the Mississippi River in Louisiana is estimated to have declined from about 3.7 million acres present 100 years to less than 300,000 acres today. Examples dominated by trees > 100 years old are exceedingly rare.

EXTENT ON DISTRICT:

Extensive and common, although stands over 80 years old are rare. In general, the community type has been favored on the Vernon.

REMARKS ON OVERALL CURRENT CONDITION ON DISTRICT:

Many good to excellent quality longleaf forests are present on the Vernon District (although relatively young: < 80 years for overstory dominants). Comparatively large bodies of longleaf forest are present; this district, considered in combination with the adjacent U.S. Army Fort Polk Military Reservation, supports the greatest concentration of longleaf pine forest remaining in the state.

DESCRIPTION OF THE SURVEY AND SITE ACCOUNTS

SURVEY METHODOLOGY

This survey was conducted over approximately four months, beginning in May 1994 and ending in September 1994. Areas already examined and surveyed for natural communities by others were excluded from the survey. Excluded areas included those areas previously surveyed by the Louisiana Natural Heritage Program, all herbaceous bog communities, and the "Intensive Use Area" (regularly used for Fort Polk military training) of the Vernon District (Hart and Lester 1993). The following management zones within the district were also excluded from the survey: recreational areas, military ranges, and cultural resource sites. These management zones make up several areas that were not surveyed on the Vernon District, including Fullerton Lake National Historic Site and campground area, Enduro Campground area, Dove Field, and Cypress Pond Recreational Area (the old CCC headquarters). In addition, three compartments (compartments 7,8, and 12), were not surveyed due to the complete conversion of natural longleaf pine communities (which formerly occupied more than 90% of the compartments) to slash pine plantations.

This survey was performed on a compartment by compartment basis. Due to the constraints of time it was not possible to visit and examine every stand within each compartment. Instead, the stands presumed to have the highest natural quality were selected for examination. Information obtained from compartment prescriptions, aerial photographs, ground reconnaissance and KNF personnel was instrumental in determining stands to survey. Stand age was considered an important factor in stand selection. We assumed that, in general, older stands are more representative of presettlement natural communities than younger stands. For the most part, stands surveyed were those dominated by trees greater than 60 years old.

A standardized survey procedure was employed to obtain essential information regarding each natural community occurrence (see Appendix A). An "occurrence" is the area occupied by a particular natural community. Preliminary site selection was done within the framework of existing stand boundaries designated within the Vernon District. However, because stand boundaries often encompass more than one community type, community

boundaries do not always correspond to USFS stand boundaries. This is particularly true for relatively small areas designated as stands managed principally for the Red-cockaded Woodpecker. At times when delineating a longleaf pine forest community occurrence, a number of these smaller RCW stands were included within one community occurrence. Natural community boundaries were drawn on US Geological Survey 7.5-minute topographic quadrangle maps, and were drawn to include only one community type.

An attempt was made to survey three stands in each compartment for each of 30 compartments (three compartments were not included, see above). A total of 82 stands were surveyed and many others visited (see Appendix B). Once stands were selected, ground reconnaissance was used to determine the boundaries of a community occurrence and to obtain general information regarding community structure, species composition, fire frequency, disturbance history, soil conditions and other biotic and abiotic features of the site. A 20m X 50m transect was established in a representative position in each occurrence. Species composition and diameters of all woody stems greater than two inches dbh (diameter breast height) were determined within the transect. Next, percent cover of small trees and shrubs (<2 inches dbh) and herbaceous flora was estimated within five 10m X 10m sub-plots along the transect. Visual percent cover by species was estimated for the five most common woody and herbaceous species in each subplot. In addition, the entire 20m X 50m transect was surveyed for any additional plant species not included in the 10m X 10m sub-plots.

For each present-day natural community occurrence, a judgement was made of the presettlement community type. Based on the similarity of the present-day community to its presumed original condition, a quality rank of A, AB, B, BC or C was assigned to each occurrence. The quality of sites ranged from very high, designated with an "A" rank, to poor, designated with a "C" rank. The quality ranks of each community occurrence surveyed on the district is presented in Table 2.

In general, an "A" rank was reserved for old-growth forests. For the purposes of this project, an "old-growth" forest is defined as one in which the relative abundances and age-class distributions of dominant species approximate what would be expected under presettlement conditions as determined from both historical notes and characteristics of existing old-growth forests (*e.g.*, Platt *et al.* 1988). Evidence of timber removal was not

Table 2. A summary of the ranks assigned to each natural plant community occurrence surveyed on the Vernon District, KNF.

COMP	STAND	NATURAL COMMUNITY TYPE	RANK
2	3	Upland Longleaf Pine Forest	B
2	17	Upland Longleaf Pine Forest	AB/B
2	36	Upland Longleaf Pine Forest	B
3	27	Mixed Hardwood-Loblolly Pine Forest	B
5	1	Upland Longleaf Pine Forest	AB/B
5	3	Upland Longleaf Pine Forest	AB/B
5	22	Upland Longleaf Pine Forest	AB/B
6	27	Upland Longleaf Pine Forest	AB/B
9	6	Upland Longleaf Pine Forest	AB/B
9	31	Upland Longleaf Pine Forest	AB/B
10	41	Bayhead Swamp	AB/B
10	21	Upland Longleaf Pine Forest	AB/B
10	33	Upland Longleaf Pine Forest	A/AB
10	41	Riparian Forest	A/AB
10	48	Upland Longleaf Pine Forest	AB/B
10	50	Upland Longleaf Pine Forest	B
10	61	Upland Longleaf Pine Forest	AB/B
11	5	Riparian Forest	A/AB
13	6	Riparian Forest	B
13	10	Riparian Forest	B/BC
13	11	Mixed Hardwood-Loblolly Pine Forest	B
14	3	Upland Longleaf Pine Forest	AB/B
14	4	Upland Longleaf Pine Forest	A/AB
14	6	Upland Longleaf Pine Forest	B

15	8	Upland Longleaf Pine Forest	B/BC
15	19	Upland Longleaf Pine Forest	B/BC
15	28	Upland Longleaf Pine Forest	AB/B
16	16	Upland Longleaf Pine Forest	A/AB
16	17	Upland Longleaf Pine Forest	AB/B
16	19	Upland Longleaf Pine Forest	AB/B
17	10	Upland Longleaf Pine Forest	AB/B
17	18	Upland Longleaf Pine Forest	AB/B
18	8	Mixed Hardwood-Loblolly Pine Forest	A/AB
18	11	Riparian Forest	B
18	19	Riparian Forest	AB/B
18	19	Mixed Hardwood-Loblolly Pine Forest	A/AB
18	19	Riparian Forest	AB/B
19	7	Riparian Forest	B
19	7	Riparian Forest	A/AB
20	2	Upland Longleaf Pine Forest	AB/B
20	22	Riparian Forest	AB/B
20	22	Riparian Forest	AB/B
20	51	Upland Longleaf Pine Forest	AB/B
20	52	Upland Longleaf Pine Forest	B
20	56	Upland Longleaf Pine Forest	AB/B
21	3	Upland Longleaf Pine Forest	A/AB
21	10	Upland Longleaf Pine Forest	AB/B
21	30	Upland Longleaf Pine Forest	AB/B
21	33	Upland Longleaf Pine Forest	B
22	2	Upland Longleaf Pine Forest	B
22	8	Upland Longleaf Pine Forest	B

Table 2. Cont'd.

22	43	Upland Longleaf Pine Forest	AB/B
23	22	Upland Longleaf Pine Forest	B/BC
23	25	Upland Longleaf Pine Forest	AB/B
23	30	Upland Longleaf Pine Forest	AB/B
23	44	Upland Longleaf Pine Forest	B
24	14	Upland Longleaf Pine Forest	B
24	26	Upland Longleaf Pine Forest	AB/B
24	42	Upland Longleaf Pine Forest	AB/B
24	45	Upland Longleaf Pine Forest	AB/B
24	57	Upland Longleaf Pine Forest	AB/B
24	58	Upland Longleaf Pine Forest	B
25	1	Upland Longleaf Pine Forest	A/AB
25	10	Upland Longleaf Pine Forest	AB/B
25	12	Upland Longleaf Pine Forest	AB/B
26	7	Mixed Hardwood-Loblolly Pine Forest	B
26	26	Upland Longleaf Pine Forest	B
26	38	Upland Longleaf Pine Forest	AB/B
26	39	Upland Longleaf Pine Forest	AB/B
28	12	Upland Longleaf Pine Forest	AB/B
28	19	Pine Flatwoods	AB/B
28	28	Pine Flatwoods	AB/B
29	17	Upland Longleaf Pine Forest	B/BC
29	23	Upland Longleaf Pine Forest	B/BC
30	3	Upland Longleaf Pine Forest	B
30	24	Upland Longleaf Pine Forest	AB/B
30	28	Upland Longleaf Pine Forest	AB/B
31	1	Upland Longleaf Pine Forest	B/BC

Table 2. Cont'd.

31	11	Upland Longleaf Pine Forest	B/BC
32	19	Upland Longleaf Pine Forest	A/AB
32	19	Upland Longleaf Pine Forest	A/AB
32	30	Upland Longleaf Pine Forest	A

necessarily considered grounds for rejecting an occurrence as an old-growth stand. One obvious piece of evidence of old-growth forests was the presence of old trees, for example, longleaf pine trees with flat tops or gnarly branches at the top, indicating a tree 100 or more years old. Most of the dominant tree species within the primary community types of the Vernon District can reach ages greater than 200 years (*e.g.*, beech, white oak), and up to 400 years or more for longleaf pine (Mohr 1897, Glitzenstein *et al.* 1986, Platt *et al.* 1988). The presence of many old trees in an area was a strong indication that a portion of the forest had been missed or passed over by loggers earlier in the century. Other indicators of old-growth conditions included standing dead trees, canopy gaps, fallen logs, old vines, and a wide distribution of tree age-classes.

Rank "AB" was given to relatively mature forests that were not old-growth but were only slightly disturbed. "Mature " here means that the dominant overstory species are much beyond sexual maturity, but it does not imply that the forest has reached any sort of steady state dynamics. In fact, most of these occurrences will not reach their natural structure and age-class distribution for decades or even centuries. Occurrences that were only slightly fire suppressed were also given this rank.

The rank of "B" was given to immature forests. "Immature" forests are defined as having young even-aged forest structure with few or no older age classes represented. In addition, occurrences that were moderately fire suppressed were given a quality rank of B. Longleaf pine community occurrences that exhibited poor diversity in the ground cover (*i.e.*, low species diversity) due to fire suppression or shading, were also given a quality rank of B, regardless of overstory condition.

Quality ranks of "BC" and "C" were assigned to community occurrences that were significantly altered from their presettlement condition. A quality rank of BC was given to those occurrences that retained at least some remnants of their original nature. A quality rank of C was reserved for those occurrences that demonstrated little to no evidence of their original presettlement condition.

SITE ACCOUNTS

Of the 82 natural community occurrences surveyed on the Vernon District, 20 occurrences of various types are presented here in detail. These occurrences were assigned site names and are grouped by natural community type, from wetland types to upland types. The boundary shown on the map for each site generally encircles only the occurrence of a particular natural community.

The sites chosen for presentation were those judged to possess the highest overall natural quality, and are considered, in general, to be those most similar to their presettlement condition. However, due to time constraints, many high-quality natural community occurrences located in this survey are not presented in detail in this section, but are referenced in Table 2. and Appendix B.

Although many of the sites presented are relatively small, they represent highly significant remnants of natural communities indigenous to the area, and with judicious stewardship, should provide insight into the natural dynamics and composition of these communities, and serve as reservoirs of specialized native species dependent on particular forest conditions. However, for conservation purposes, it is always best to consider larger areas where possible. Where a number of small sites are clustered in near proximity, the best conservation option may be to administer the sites as one unit.

SITE NAME: Drake's Creek Gum Pond

LNHP TYPE: Bayhead Swamp
USFS TYPE: White Oak-Northern Red Oak-Hickory, Immature Sawtimber (53-12)

QUAD: Chasemore, LA
COMPARTMENT: 10
STAND: 41
TRS: T1S, R8W, SECT 12
DISTANCE AND DIRECTION OF NEAREST TOWN: Sugrue is approximately 6 miles southeast

GENERAL DESCRIPTION: This is an older stand of swamp black gum dominated bayhead swamp that makes up a portion of the floodplain forest along the west side of Drake's Creek. The canopy also contains sweetgum, swamp white oak, sweet bay, and laurel oak. The midstory is sparse but composed of laurel oak, sweet bay, horse sugar, American holly, and fetterbush. The woody understory is sparse and characterized by sweetbay, red bay, red maple, swamp black gum, sweetgum, oaks and huckleberries. Herbaceous layer is sparse and composed of sedges, ferns, sphagnum moss, panic grass, and spangle-grasses.

APPEARANCE: This is a closed canopy forest with an open midstory.

USFS STAND AGE: 1920, 75 years

ACREAGE OF OCCURRENCE: Approximately 35 acres

SETTING (TOPOGRAPHY, GEOLOGY, SOILS): This occurrence is in a broad, very shallow, ponded area in the Drake's Creek floodplain. It appears the area is typically flooded throughout the winter and into early spring. It is associated with Guyton soil, a dark gray silty loam with poor drainage. The elevation is about 200-210 feet.

FIRE HISTORY: No evidence of fire within the last 20 or more years

OLD-GROWTH CHARACTERISTICS: There are many standing dead small trees and downed large woody debris in the area. Forest structure is uneven aged representing a variety of age-classes with a dominance of large hardwoods making up the stand. Small gaps were found in canopy, with little to no vine growth throughout the stand.

DISTURBANCE HISTORY: There is very little evidence of disturbance, some stumps present as a result of earlier logging.

UNIQUE CHARACTERISTICS: This is a unique community type in the Vernon District. This occurrence represents one variation of Bayhead Swamps found on the Vernon District.

SIGNIFICANCE: This forest is a good representation of the diversity of community types found along Drake's Creek.

OVERALL NATURAL COMMUNITY QUALITY: AB/B

JUSTIFICATION: Qualities that enhance the ecological value of this forest include the closed canopy and open midstory condition, uneven-age forest structure, little evidence of disturbance, and the presence of a few older trees.

VEGETATION:
TRANSECT SAMPLE DATA

OVERSTORY/MIDSTORY DBH CLASS DISTRIBUTION*
(inches)

SPECIES	2-5	>5-10	>10-15	>15-20	>20-25	>25-30	>30-35	>35
Liquidambar styraciflua	2	3						
Magnolia virginiana	7	5	7					
Nyssa biflora	9	12	8	1	2		1	
Ilex opaca	5	4						
Quercus laurifolia	2	1		1	1	1		
Quercus michauxii			2					
Acer rubrum	1	2						

*number of stems given in each dbh class.

PERCENT WOODY COVER BY PLOT*

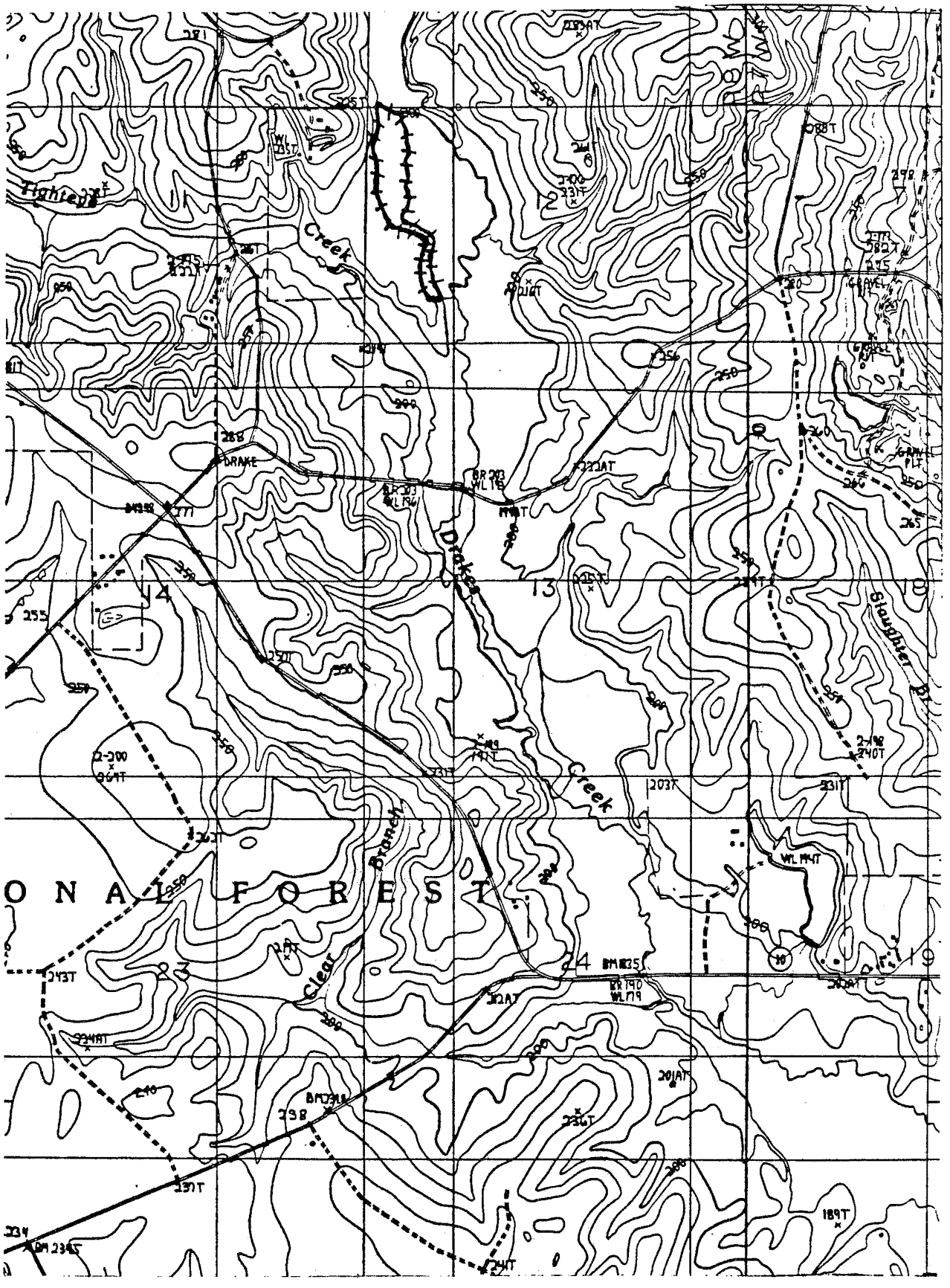
SPECIES (woody)	PLOT 1	PLOT 2	PLOT 3	PLOT 4	PLOT 5
Magnolia virginiana	<5	5-10	<5	<5	10-25
Vaccinium elliottii	<5	5-10	5-10	5-10	5-10
Nyssa biflora	<5				
Acer rubrum	<5				
Ilex opaca	<5	<5	<5	10-25	
Liquidambar styraciflua		5-10	<5		
Lyonia lucida		5-10		5-10	5-10
Quercus laurifolia			<5		
Rhododendron sp.				<5	
Persea barbonia					<5
Quercus michauxii					5-10

*includes all woody plants and vines < 2 inches in dbh. Cover classes include <5%, 5-10%, 10-25%, 25-50%, 50-75%, and >75%.

PERCENT HERBACEOUS COVER BY PLOT*

SPECIES (herbs)	PLOT 1	PLOT 2	PLOT 3	PLOT 4	PLOT 5
Sphagnum spp.	5-10	<5	10-25	25-50	25-50
Carex spp.	<5	<5	5-10	10-25	5-10
Onoclea sensibilis	<5	<5		<5	5-10
Boehmeria cylindrica	<5				
Scleria sp.		<5	<5	<5	<5
Chasmanthium sp.		<5	<5	5-10	5-10
Dichanthelium boscii	<5		<5		

*cover classes include <5%, 5-10%, 10-25%, 25-50%, 50-75%, and >75%.


Fightenot
Creek
DRAKE
Drake
Slaughter Dr
Clear Branch
Creek
O N A L F O R E S T
12
13
14
23
24
19

SITE NAME: Little Brushy Longleaf Flatwoods

LNHP TYPE: Pine Flatwoods
USFS TYPE: Longleaf Pine, Immature Sawtimber (21-12)

QUAD: Pitkin, LA
COMPARTMENT: 28
STAND: 19
TRS: T1S, R5W, SECT 7
DISTANCE AND DIRECTION OF NEAREST TOWN:Fullerton is 3 miles west

GENERAL DESCRIPTION: This occurrence is found on a broad flat ridgetop. In general, the topography is flat throughout the area, except where streams dissect the landscape. In this forest, longleaf pine dominates as the canopy species. The midstory is composed of southern red, post and blackjack oaks. The woody understory is dominated by wax myrtle, southern red oak, black cherry, red maple, and sumac. The herbaceous layer is very diverse and is dominated by little bluestem, toothache grass, blazing stars, black-eyed Susans, and many species of legumes.

APPEARANCE: This stand has an open aspect and a grass dominated understory in a flat terrain.

USFS STAND AGE: 1934, 61 years

ACREAGE OF OCCURRENCE: Approximately 30-40 acres

SETTING (TOPOGRAPHY, GEOLOGY, SOILS): This occurrence is located in the extreme southwestern part of the Vernon District on a broad, flat ridgetop of the High Pleistocene Terraces. The elevation of this stand is 210 feet. The dominant soil type is Beauregard, a deep, moderately well-drained fine sandy and silty loam soil formed from loamy sediments of Pleistocene age.

FIRE HISTORY: This area is fairly frequently burned. It appears the most recent burn occurred about 1994.

OLD-GROWTH CHARACTERISTICS: This stand partially exhibits old-growth characteristics. While there are few standing dead trees, there is much fallen woody debris on the forest floor. Few canopy gaps are present and there is little diversity in tree age, with most trees between 50 and 75 years old. There are, however, a few older damaged trees present in this stand (greater than 100 years old). There is very little natural regeneration of longleaf pine.

DISTURBANCE HISTORY: Some old roads, fire breaks, and previous timber removal are evident, but these features have not significantly degraded the quality of the area.

UNIQUE CHARACTERISTICS: Relatively intact examples of Pine Flatwoods are rare on the Vernon District. The great majority of the area that originally supported this community type has not been frequently burned or has been converted to slash pine plantation. Beauregard soils are not common in the survey area.

SIGNIFICANCE: This occurrence is one of few good quality examples of longleaf pine flatwoods on the Vernon District.

OVERALL NATURAL COMMUNITY QUALITY: AB/B

JUSTIFICATION: Features that enhance the ecological value of this forest include pure longleaf pine overstory, open forest structure, high herb diversity, and fairly high fire frequency. The poor qualities of this stand include little natural longleaf pine regeneration, moderate amount of hardwood growth, and previous mechanical disturbances.

VEGETATION:
TRANSECT SAMPLE DATA

OVERSTORY/MIDSTORY DBH CLASS DISTRIBUTION*
(inches)

SPECIES	2-5	>5-10	>10-15	>15-20	>20-25	>25-30	>30-35	>35
Pinus palustris	5	7	9	7	1			
Quercus marilandica	2							
Quercus stellata	3							
Quercus falcata	2							

*number of stems given in each dbh class.

PERCENT WOODY COVER BY PLOT*

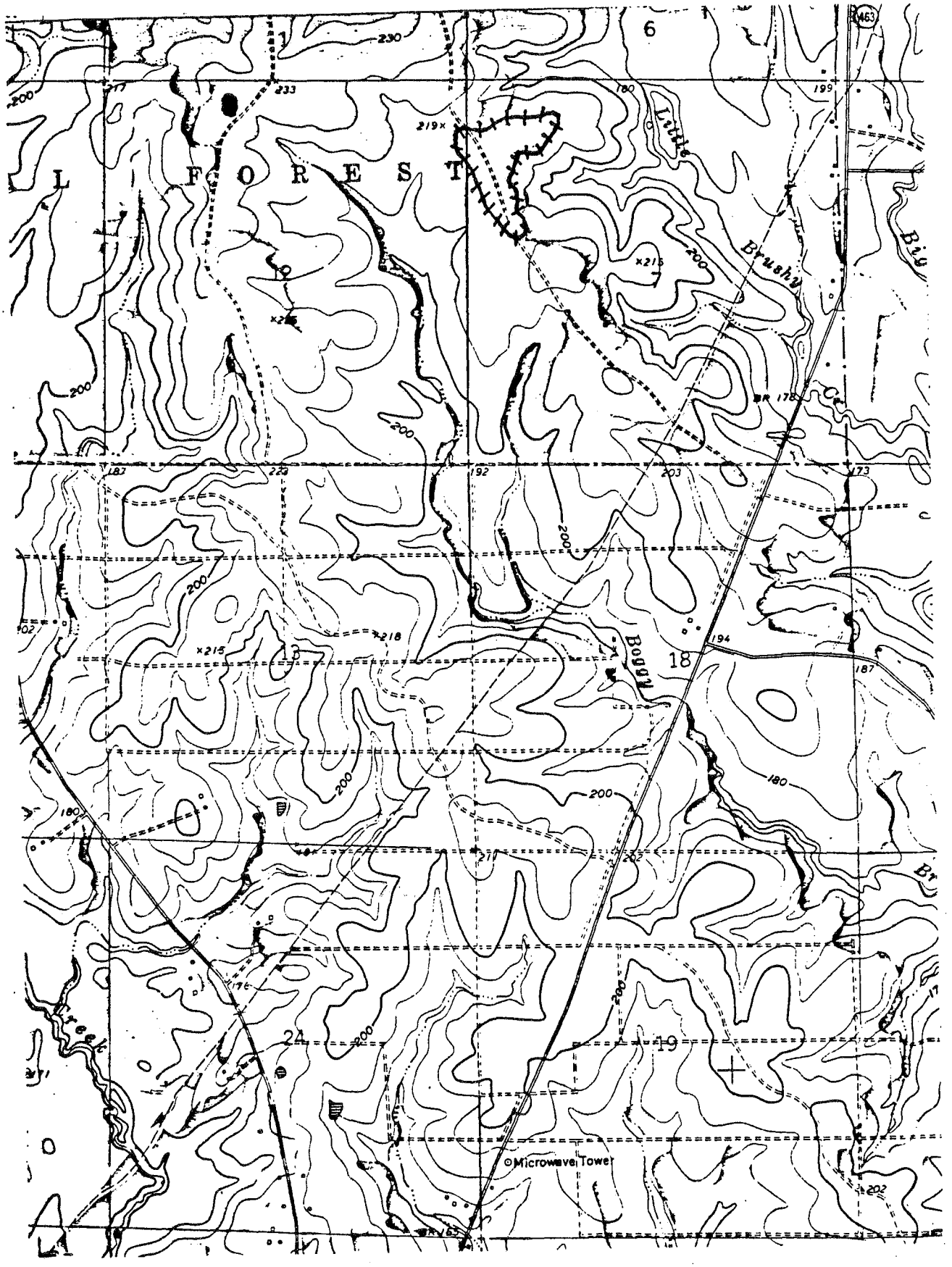
SPECIES (woody)	PLOT 1	PLOT 2	PLOT 3	PLOT 4	PLOT 5
Myrica cerifera	<5	<5	<5	5-10	<5
Tephrosia virginiana	5-10		5-10		<5
Rhus copallina	<5	5-10			
Rubus sp.	<5	5-10	5-10	5-10	
Smilax bona-nox	<5		<5		
Quercus falcata		<5	<5	<5	
Berchemia scandens				<5	<5
Quercus stellata					<5
Prunus serotina		<5		<5	<5

*includes all woody plants and vines < 2 inches in dbh. Cover classes include <5%, 5-10%, 10-25%, 25-50%, 50-75%, and >75%.

PERCENT HERBACEOUS COVER BY PLOT*

SPECIES (herbs)	PLOT 1	PLOT 2	PLOT 3	PLOT 4	PLOT 5
Schizachyrium scoparium	75-100	25-50	25-50	50-75	50-75
Hedyotis nigricans	5-10		5-10	5-10	
Ctenium aromaticum	<5	<5		<5	
Schizachyrium tenerum	<5		<5		
Liatris acidota	<5		5-10		
Dichanthelium aciculare		<5		<5	
Pycnanthemum sp.		10-25			
Andropogon gerardii					<5
Rudbeckia grandiflora					5-10
Pityopsis graminifolia					<5
Eupatorium rotundifolium		5-10	5-10	5-10	10-25

*cover classes include <5%, 5-10%, 10-25%, 25-50%, 50-75%, and >75%.


L F O R E S T
Little
Brushy
Boggy
Microwave Tower
6
18
24
19
13

SITE NAME: Drake's Creek Fishing Trail

LNHP TYPE: Riparian Forest
USFS TYPE: Loblolly Pine, Immature Sawtimber (13-12)

QUAD: Chasemore, LA
COMPARTMENT: 11
STAND: 5
TRS: T1S, R8W, SECT13
DISTANCE AND DIRECTION OF NEAREST TOWN: Sugrue is 4 miles southeast

GENERAL DESCRIPTION: A closed canopy forest dominated by large loblolly pines, American beech and white oaks with sweetgum, black gum, water, laurel and cow oaks as minor components in the canopy. The midstory is somewhat diverse but mostly contains canopy species saplings as well as red maple, American holly, witch hazel, tree huckleberry, horse sugar, small southern magnolias, and some vine species. The herb component is comprised principally of spangle-grasses, partridge-berry, panic grasses, sedges, and St. John's wort.

APPEARANCE: This stand has a significant portion of large trees in the canopy with a very open midstory and a mostly continuous herb layer with low species diversity.

USFS STAND AGE: 1913, 82 years

ACREAGE OF OCCURRENCE: Approximately 100 acres

SETTING (TOPOGRAPHY, GEOLOGY, SOILS): This occurrence is found along the flat bottoms of Drake's creek. The elevation is between 190 and 200 feet. The soil type in this area is Guyton, a poorly drained silty loam soil associated with Holocene alluvium stream bottoms.

FIRE HISTORY: No evidence of fire within last 20 years or more.

OLD-GROWTH CHARACTERISTICS: There are many old standing dead trees, indicating little disturbance. There are also many downed and fallen trees on the forest floor. There is a good distribution of uneven ages and sizes of canopy tree species with numerous large loblolly pine.

DISTURBANCE HISTORY: There has been some previous timber removal in this stand. A clearing has been made for a parking area for recreational use.

SIGNIFICANCE: A good representation of uneven-age forest structure, older trees, and good canopy species diversity for the Vernon District. Some of the largest loblolly pines on the Vernon District are found in this forest.

OVERALL NATURAL COMMUNITY QUALITY: A/AB

JUSTIFICATION: The qualities that enhance the ecological value of this forest include older trees, a well-developed midstory and that it is a fairly large continuous tract. However, there are small areas of disturbance within the tract due to timber removal that left canopy gaps and areas of thick shrub growth and dense midstory.

VEGETATION:
TRANSECT SAMPLE DATA

OVERSTORY/MIDSTORY DBH CLASS DISTRIBUTION*
(inches)

SPECIES	2-5	>5-10	>10-15	>15-20	>20-25	>25-30	>30-35	>35
Liquidambar styraciflua	5	2		1				
Fagus grandifolia	4		1	2				
Quercus alba			3	2	1			
Acer rubrum	3	1						
Ilex opaca	14	2						
Nyssa sylvatica	14	2						
Pinus taeda					1	4		1
Hamamelis virginiana	1							
Quercus nigra		1		1				
Quercus michauxii		1	3	1	2			
Quercus laurifolia		1						

*number of stems given in each dbh class.

PERCENT WOODY COVER BY PLOT*

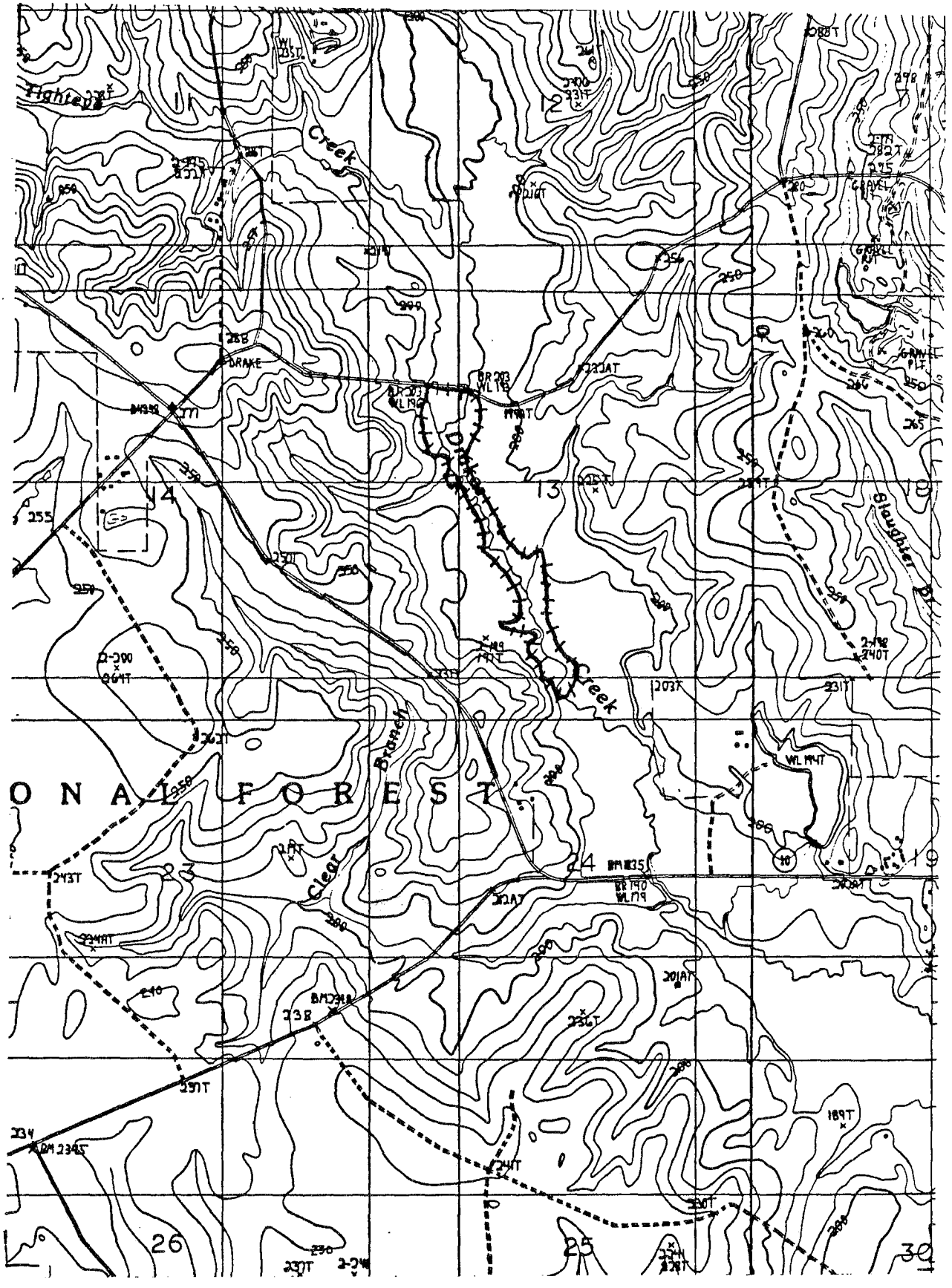
SPECIES (woody)	PLOT 1	PLOT 2	PLOT 3	PLOT 4	PLOT 5
Nyssa sylvatica	<5		<5		<5
Ilex opaca	5-10		25-50	5-10	<5
Liquidambar styraciflua	5-10				
Vaccinium elliottii	5-10	10-25	5-10	<5	<5
Bignonia capreolata	10-25				
Acer rubrum		5-10	<5		
Fagus grandiflora		<5			
Hamamelis virginiana		5-10			<5
Magnolia grandiflora		<5		<5	
Quercus nigra			<5	<5	
Symplocos tinctoria				<5	
Smilax rotundifolia					<5

*includes all woody plants and vines < 2 inches in dbh. Cover classes include <5%, 5-10%, 10-25%, 25-50%, 50-75%, and >75%.

PERCENT HERBACEOUS COVER BY PLOT*

SPECIES (herbs)	PLOT 1	PLOT 2	PLOT 3	PLOT 4	PLOT 5
Hypericum spp.	<5	<5	<5	<5	<5
Carex spp.	<5	<5	<5	<5	<5
Mitchella repens	<5	<5	<5	<5	<5
Chasmanthium sp.	5-10	<5	10-25	<5	<5
Panicum spp.	<5	<5	<5	<5	<5

*cover classes include <5%, 5-10%, 10-25%, 25-50%, 50-75%, and >75%.


Fightcamp
Creek
BRAKE
BR 203
WL 178
BR 201
WL 190
Dry Fork
Creek
Slaughter Br
Clear Branch
ONAL FOREST
12
13
14
23
24
25
26
30
GRAVEL PIT
WL 194T
BR 190
WL 179
BM 2345

SITE NAME: Whiskey Chitto Loblolly

LNHP TYPE: Riparian Forest
USFS TYPE: Bottomland Hardwood-Yellow Pine, Immature Sawtimber (46-12)

QUAD: Sugrue, LA
COMPARTMENT: 19
STAND: 7
TRS: T1S, R7W, SECTS 23 and 26
DISTANCE AND DIRECTION OF NEAREST TOWN: Sugrue is approximately 2 miles northeast

GENERAL DESCRIPTION: A mostly closed canopy forest dominated by loblolly pine with few white oak, southern red oak, sweetgum, hickory, and American beech in the canopy. There is a diverse, but open, midstory composed of mulberry, canopy saplings, red maple, tree huckleberry, witch hazel, dogwood, and hophornbeam. The herbaceous layer is sparse and composed of spangle-grasses, sedges, panic grasses, day flower, and elephant's-foot.

APPEARANCE: The forest structure is characterized by a closed canopy, open diverse midstory, with a sparse understory and herbaceous layer.

USFS STAND AGE: 1942, 53 years

ACREAGE OF OCCURRENCE: Approximately 90 acres

SETTING (TOPOGRAPHY, GEOLOGY, SOILS): This occurrence is located along Whisky Chitto Creek. The topography is mostly flat except along the banks of Whisky Chitto Creek. The elevation is approximately 150-160 feet. The soil type is Guyton soil, a poorly drained silty loam associated with Holocene alluvium stream bottoms.

FIRE HISTORY: No evidence of fire within last 20 or more years

OLD-GROWTH CHARACTERISTICS: There are a fair number of large standing dead trees, and a few fallen logs within the area creating small gaps within the canopy. There is a considerable amount of large woody debris within the area. The forest contains many different ages of each canopy species and is a good example of uneven age structure.

DISTURBANCE HISTORY: There is very little evidence of disturbance in this area. An old tram (logging railroad bed) exists on the north side of this site. There are some stumps present indicating timber removal in the past.

SIGNIFICANCE: This stand is a good example of a less disturbed mixed hardwood-loblolly forest grading into a riparian forest closer to the banks of Whisky Chitto Creek.

OVERALL NATURAL COMMUNITY QUALITY: A/AB

JUSTIFICATION: Qualities that enhance the ecological value of this forest include uneven-age distribution of trees, the diverse midstory, and mostly closed canopy. Negative features of this site include the presence of young canopy tree species and dense shrub growth in more disturbed areas (due to timber removal or railroad construction).

VEGETATION:
TRANSECT SAMPLE DATA

OVERSTORY/MIDSTORY DBH CLASS DISTRIBUTION*
(inches)

SPECIES	2-5	>5-10	>10-15	>15-20	>20-25	>25-30	>30-35	>35
Cornus florida	6	1						
Vaccinium arboreum	1							
Carya cordiformis	1	1	1					
Quercus alba	2	2	4		1			
Ostrya virginiana	11	1						
Morus rubra	1							
Pinus taeda		6	3	7	6			
Carpinus caroliniana	4							
Acer rubrum	6	3						
Liquidambar styraciflua			1					
Quercus falcata	1							
Ilex vomitoria	1							
Carya tomentosa		1						

*number of stems given in each dbh class.

PERCENT WOODY COVER BY PLOT*

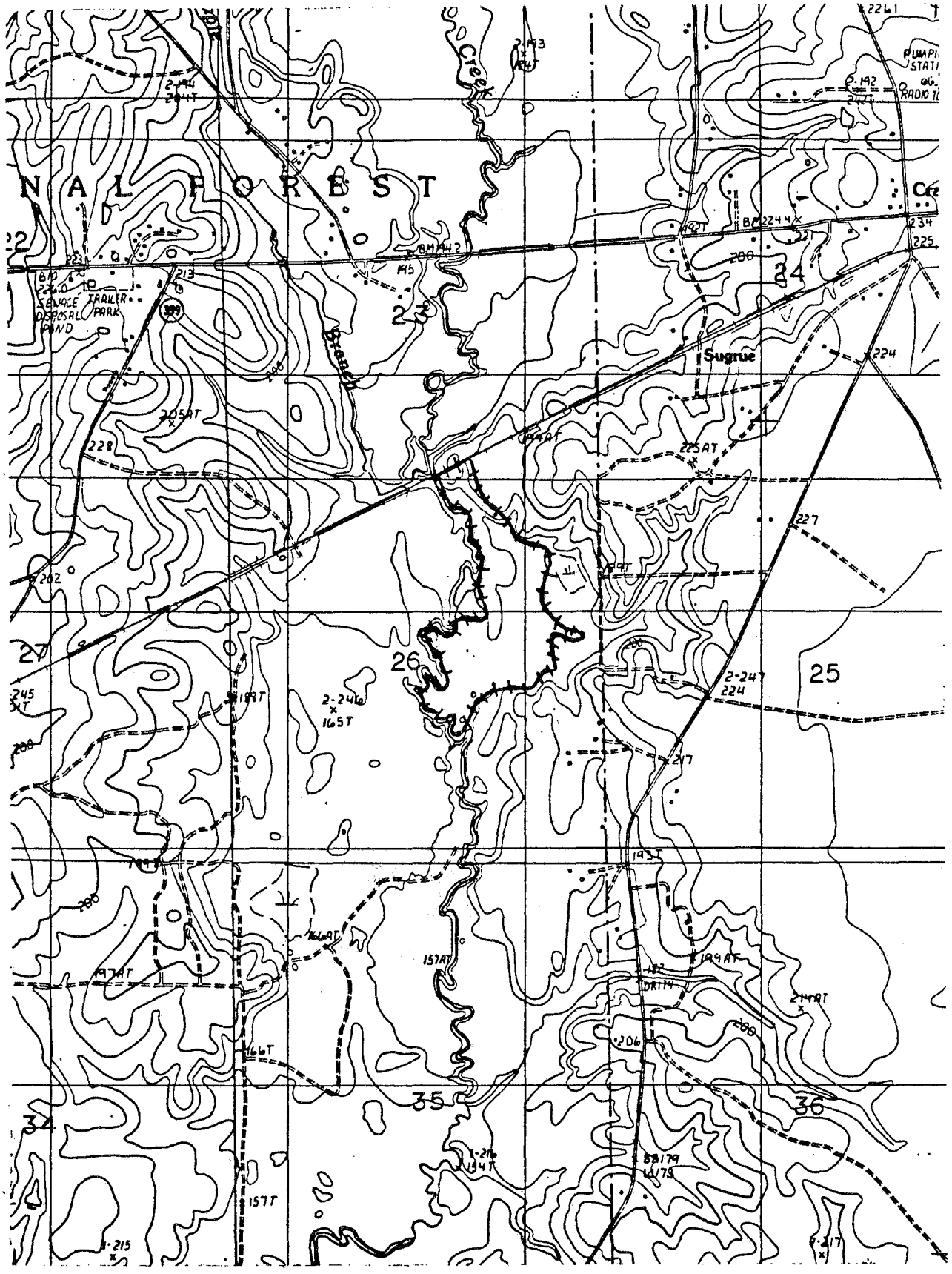
SPECIES (woody)	PLOT 1	PLOT 2	PLOT 3	PLOT 4	PLOT 5
Ostrya virginiana	50-75	5-10	25-50		
Ilex vomitoria	5-10	5-10	<5		10-25
Cornus florida	<5	5-10			
Smilax glauca	<5				
Callicarpa americana	<5				<5
Smilax pumila		5-10			
Vitis rotundifolia		25-50	50-75	10-25	5-10
Sassafras albidum			5-10		
Ilex opaca			<5		
Acer rubrum				5-10	5-10
Vaccinium elliottii				<5	
Carpinus caroliniana				<5	
Quercus phellos				<5	
Magnolia grandiflora					<5

*includes all woody plants and vines < 2 inches in dbh. Cover classes include <5%, 5-10%, 10-25%, 25-50%, 50-75%, and >75%.

PERCENT HERBACEOUS COVER BY PLOT*

SPECIES (herbs)	PLOT 1	PLOT 2	PLOT 3	PLOT 4	PLOT 5
Chasmanthium sessiliflorum	5-10	5-10	5-10	5-10	<5
Carex spp.	<5		<5	<5	
Dichanthelium boscii	<5	<5			<5
Tradescantia sp.	<5				
Scutellaria integrifolia	<5		<5	<5	
Sanicula sp.		<5			
Aster sp.		<5			
Elephantopus carolinianus		<5	<5	<5	
Desmodium sp.			<5	<5	
Scleria oligantha					<5
Dichanthelium dichotomum					<5
Euphorbia corollata					<5

*cover classes include <5%, 5-10%, 10-25%, 25-50%, 50-75%, and >75%.


NAL FOREST
Creek
Sugrue
Branch
SEWAGE DISPOSAL POND
TRAILER PARK
BM 2244
BM 1442
2261
224
225
227
234
26
25
35
36
34
27
22
23
24

SITE NAME: Drake's Creek Flats

LNHP TYPE: Riparian Forest
USFS TYPE: Bottomland Hardwood Forest-Yellow Pine, Immature Sawtimber (46-12)

QUAD: Sugrue, LA
COMPARTMENT: 18
STAND: 19
TRS: T1S, R7W, SECT 29
DISTANCE AND DIRECTION OF NEAREST TOWN: Sugrue is approximately 3.5 miles northeast

GENERAL DESCRIPTION: This occurrence has a somewhat closed canopy dominated by large old loblolly pines. Other canopy species include American beech, white oak, swamp black gum, water oak, sweetgum, and southern magnolia. A moderate diversity of species is present in the midstory; it is mainly composed of small canopy species, American holly, huckleberries, red maple, french mulberry, and silverbell. The understory is composed of regenerating overstory species, with a sparse herbaceous component consisting of partridge-berry, spangle-grasses, elephant's-foot, panic grasses, sedges, and sphagnum moss.

APPEARANCE: Closed canopy forest with a moderate midstory component and with little to no understory or herbaceous component.

USFS STAND AGE: 1897, 98 years

ACREAGE OF OCCURRENCE: 26 acres

SETTING (TOPOGRAPHY, GEOLOGY, SOILS): This occurrence is located between Drake's Creek and a small tributary into Drake's Creek. The topography is flat except where dissected by braided channels of Drake's Creek and the meandering channel of the tributary. The elevation is about 168 feet. The soil type is Guyton, a poorly drained silty loam soil associated with Holocene alluvium stream beds.

FIRE HISTORY: No evidence of fire within last 20 or more years

OLD-GROWTH CHARACTERISTICS: There are many standing dead trees (both young and old) and a considerable amount of large woody debris on the forest floor. There is uneven-age distribution of canopy species, particularly loblolly pine and American beech. There are some gaps in the canopy caused by downed trees. High shrub growth is associated with gaps. Some very large loblolly pines are present.

DISTURBANCE HISTORY: Within this occurrence there seems to be little disturbance; however, there is intense land use in immediately adjacent stands that affects this occurrence.

UNIQUE CHARACTERISTICS: This stand contains some of the older loblolly pines and American beech along Drake's Creek.

SIGNIFICANCE: This occurrence is a good example of an older less disturbed riparian forest with many older trees, high species diversity, and uneven-age forest structure.

OVERALL NATURAL COMMUNITY QUALITY: AB/B

JUSTIFICATION: Qualities that enhance the ecological value of this forest include many mature loblolly pines and some older canopy trees, uneven-age forest structure, and good species diversity. The poor qualities of this occurrence include limited size of stand, isolation in landscape due to adjacent intensive land-use practices, and some disturbed areas along edges and under canopy gaps.

VEGETATION:
TRANSECT SAMPLE DATA

OVERSTORY/MIDSTORY DBH CLASS DISTRIBUTION*
(inches)

SPECIES	2-5	>5-10	>10-15	>15-20	>20-25	>25-30	>30-35	>35
Acer rubrum	5	2						
Ilex opaca	22	8						
Fagus grandifolia	1	1	3	1				
Nyssa biflora	9	1	2					
Pinus taeda				2	5			
Quercus nigra			1					
Quercus laurifolia	1	2	3					
Liquidambar styraciflua	5							
Magnolia virginiana	7							
Magnolia grandiflora			1					
Quercus alba			1					
Vaccinium arboreum	1							

*number of stems given in each dbh class.

PERCENT WOODY COVER BY PLOT*

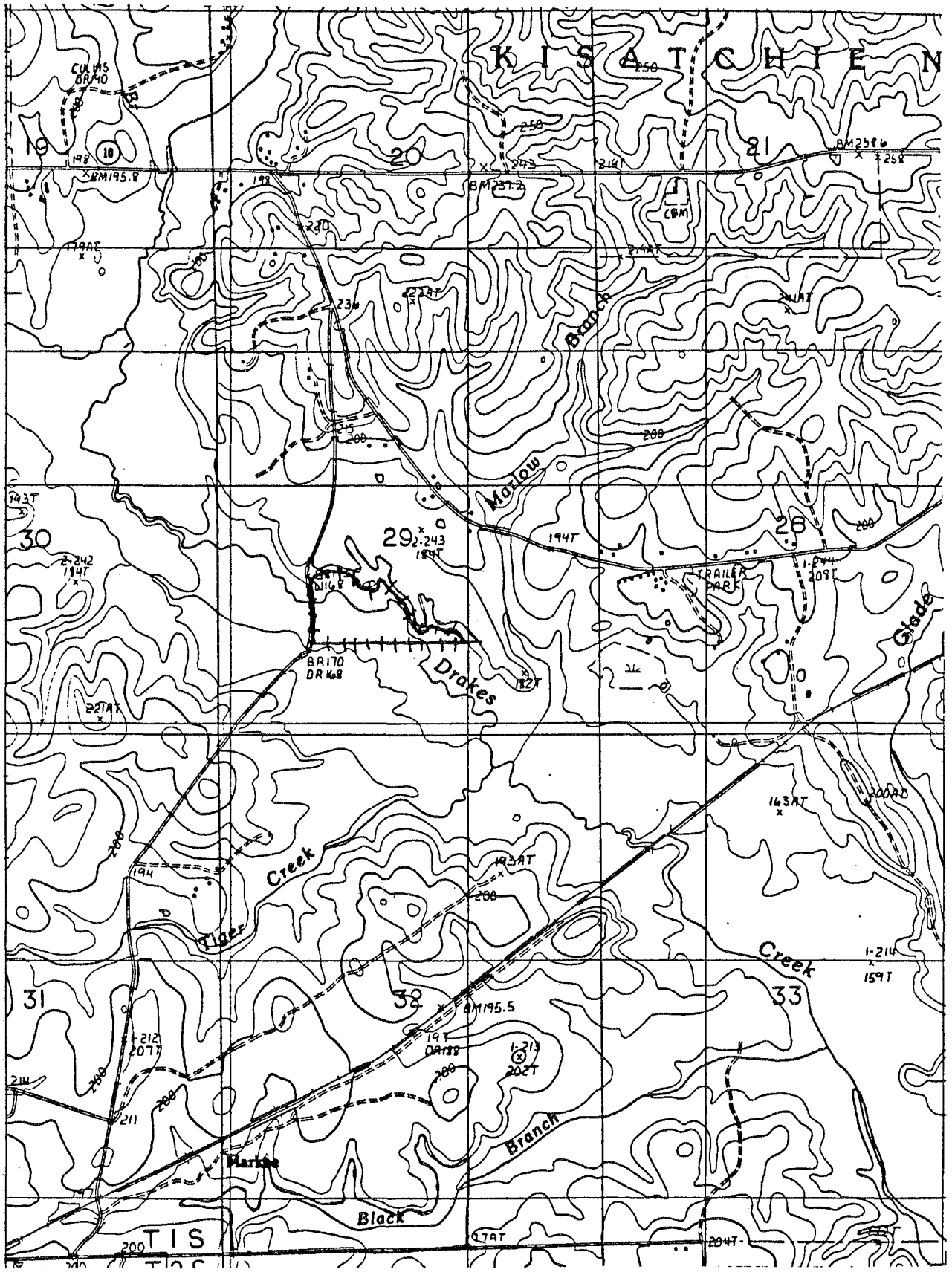
SPECIES (woody)	PLOT 1	PLOT 2	PLOT 3	PLOT 4	PLOT 5
Halesia diptera	<5			25-50	
Vaccinium elliottii	5-10	50-75	<5		5-10
Ilex opaca	<5	5-10	<5	5-10	
Smilax bona-nox	<5		<5		
Viburnum dentatum	<5				
Magnolia virginiana		<5	<5		<5
Parthenocissus quinquefolia		<5			
Acer rubrum		5-10			<5
Vaccinium arboreum			<5		
Nyssa biflora				<5	<5
Ilex sp.				25-50	5-10
Fagus grandifolia				<5	

*includes all woody plants and vines < 2 inches in dbh. Cover classes include <5%, 5-10%, 10-25%, 25-50%, 50-75%, and >75%.

PERCENT HERBACEOUS COVER BY PLOT*

SPECIES (herbs)	PLOT 1	PLOT 2	PLOT 3	PLOT 4	PLOT 5
Mitchella repens	<5	<5	<5	<5	<5
Chasmanthium sp.	<5	<5	<5	<5	5-10
Dichanthelium boscii	<5				
Carex spp.	<5	<5	<5	<5	<5
Hypericum spp.	<5	<5	<5	<5	<5
Sphagnum spp.		<5	<5	<5	
Elephantopus carolinianus					<5

*cover classes include <5%, 5-10%, 10-25%, 25-50%, 50-75%, and >75%.


K I S A T C H I E
Branch
Marlow
Drakes
Glade
Tiger
Creek
Creek
Marlow
Black
Branch
TRAILER PARK
CEM
CURVES DR 140
BR 170 DR 168
BM 195.8
BM 237.2
BM 258.6
BM 195.5
19
20
21
28
29
30
31
32
33
T 1 S

SITE NAME: Whiskey Chitto Woods

LNHP TYPE: Riparian Forest
USFS TYPE: Sweetgum-Nuttall Oak-Willow, Immature Sawtimber (62-12)

QUAD: Sugrue, LA
COMPARTMENT: 20
STAND: 22 (south end)
TRS: T1S, R7W, SECT 11
DISTANCE AND DIRECTION OF NEAREST TOWN: Sugrue is 1.5 miles south

GENERAL DESCRIPTION: This is a closed forest that is dominated by laurel oak, cow oak, water oak, swamp black gum, and hickories, with some white oak and American beech. Very little loblolly pine is present in this area. The midstory is dominated by laurel oak, cow oak, American holly, sweetgum, red maple, ironwood and small trees of canopy species. The understory is sparse and includes spangle-grasses, sedges, ferns, panic grasses and elephant's-foot.

APPEARANCE: This is a somewhat closed canopy forest with a diverse midstory that has an open appearance. A large amount of coarse woody debris can be found on the forest floor with few plants in the understory and herbaceous layers.

USFS STAND AGE: 1921, 74 years

ACREAGE OF OCCURRENCE: Approximately 40 acres

SETTING (TOPOGRAPHY, GEOLOGY, SOILS): This occurrence is found between Birds Creek and the banks of Whisky Chitto Creek. Judging from its composition, much of the forest appears to be frequently flooded or commonly flooded for somewhat extended periods. It is found at an elevation of 170-180 feet. The soil type of this area is Guyton, a poorly drained silty loam of Holocene alluvial stream bottoms.

FIRE HISTORY: No evidence of fire within the last 20 or more years

OLD-GROWTH CHARACTERISTICS: This forest demonstrates old-growth characteristics that include some standing dead trees, an essentially closed canopy with no large gaps but some small gaps, uneven-age forest structure, and large specimens of understory trees such as red maples, American holly, and ironwood.

DISTURBANCE HISTORY: There are some stumps present and a road that runs across the site, but very little other disturbance.

UNIQUE CHARACTERISTICS: This occurrence appears to be near the hydrologic extreme for Riparian Forests; below this point on the hydrologic gradient would be Bottomland Hardwood Forest.

SIGNIFICANCE: This forest has large canopy trees and is a good example of little-disturbed hardwood forest on the district.

OVERALL NATURAL COMMUNITY QUALITY: AB/B

JUSTIFICATION: Qualities that enhance the ecological value of this forest include uneven-age forest structure, some older trees in canopy and a diverse midstory. However, there is some evidence of previous disturbances such as timber removal and thinning that has significantly affected the forest structure in places.

VEGETATION:
TRANSECT SAMPLE DATA

OVERSTORY/MIDSTORY DBH CLASS DISTRIBUTION*
(inches)

SPECIES	2-5	>5-10	>10-15	>15-20	>20-25	>25-30	>30-35	>35
Quercus laurifolia			1		1			
Quercus nigra		1	3	3		2		
Carpinus caroliniana	14							
Nyssa biflora	17	2	1					
Carya glabra (?)	1			1				
Quercus pagoda		2	1					
Ilex opaca	2							
Acer rubrum	7	1						
Liquidambar styraciflua	3	4	1					
Quercus michauxii	1	3	1	2				
Quercus alba					2			
Ulmus americana	1	2						
Fagus grandifolia				1				

*number of stems given in each dbh class.

PERCENT WOODY COVER BY PLOT*

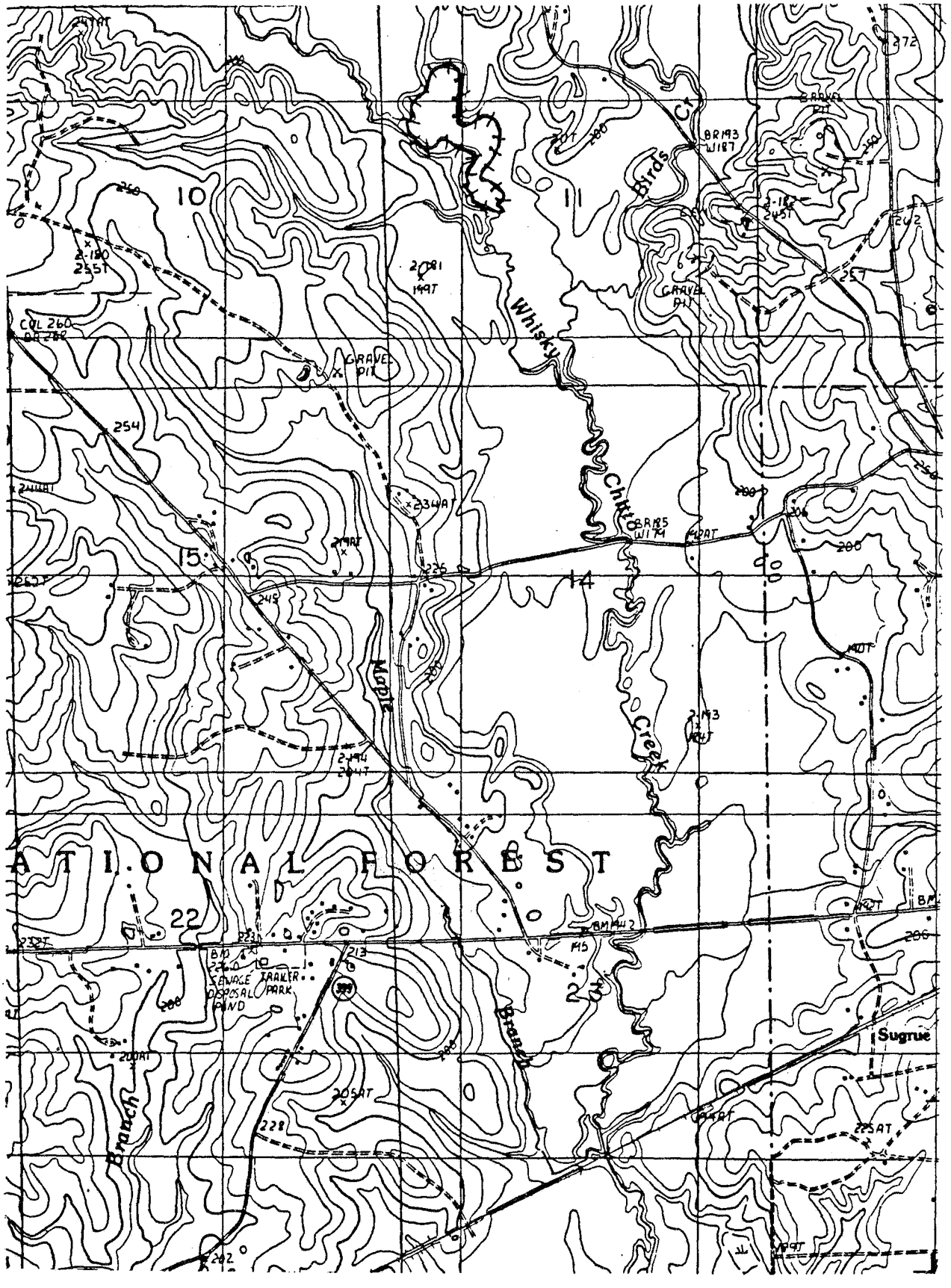
SPECIES (woody)	PLOT 1	PLOT 2	PLOT 3	PLOT 4	PLOT 5
Quercus laurifolia	10-25	5-10	10-25		
Carpinus caroliniana	<5				
Liquidambar styraciflua	<5				5-10
Acer rubrum	5-10			5-10	
Rubus sp.	<5	5-10			<5
Vitis sp.		<5	5-10		
Vaccinium elliottii		<5	<5	<5	
Smilax bona-nox		<5			<5
Nyssa biflora			5-10		
Ilex opaca			<5	<5	
Quercus nigra				5-10	10-25
Crataegus sp.				<5	
Parthenocissus quinquefolia					10-25

*includes all woody plants and vines < 2 inches in dbh. Cover classes include <5%, 5-10%, 10-25%, 25-50%, 50-75%, and >75%.

PERCENT HERBACEOUS COVER BY PLOT*

SPECIES (herbs)	PLOT 1	PLOT 2	PLOT 3	PLOT 4	PLOT 5
Chasmanthium sp.	5-10	10-25	5-10	5-10	25-50
Boehmeria cylindrica	<5	<5			
Carex spp.	5-10	5-10	<5	<5	5-10
Mitchella repens	<5	<5	<5	<5	<5
Osmunda regalis	<5				
Elephantopus caroliniana		<5		<5	
Panicum spp.			<5	<5	<5
Hypericum spp.			<5		<5

*cover classes include <5%, 5-10%, 10-25%, 25-50%, 50-75%, and >75%.


Bird's Cr.
Whisky
Chkt
Maple
Creek
Branch
Branch
Sugrue
GRAVEL PIT
GRAVEL PIT
BRAVA PIT
TRAILER PARK
SERVICE DISPOSAL LAND
BR193 W187
BR185 W174
COL 260
BR 260
2-180 255T
2-181 199T
2-182 245T
2-193
2-194
234AT
205AT
225AT
10
11
14
15
22
A T I O N A L F O R E S T

SITE NAME: Drake's Creek Bottoms

LNHP TYPE: Riparian Forest
USFS TYPE: White Oak-Northern Red Oak-Hickory, Immature Sawtimber (53-12)

QUAD: Chasemore, LA
COMPARTMENT: 10
STAND: 41
TRS: T1S, R8W, SECT 12
DISTANCE AND DIRECTION OF NEAREST TOWN: Sugrue is approximately 5 miles southeast

GENERAL DESCRIPTION: The canopy of this occurrence is dominated by loblolly pine, water oak, laurel oak, white oak, and American beech. The midstory is made up of young canopy species as well as huckleberries, American holly, horse sugar, and sweet bay. The herbaceous layer is dominated by spangle-grasses, panic grasses, sedges, and sphagnum moss.

APPEARANCE: This is mostly a closed canopy forest with an open midstory component and little herbaceous component.

USFS STAND AGE: 1920, 75 years

ACREAGE OF OCCURRENCE: Approximately 60 acres

SETTING (TOPOGRAPHY, GEOLOGY, SOILS): This occurrence follows the floodplain of Drake's Creek. The soil type is Guyton, a poorly drained silty loam soil associated with Holocene alluvium stream bottoms. This occurrence is located at about 190-200 feet elevation. The topography is mostly flat; the area is dissected by the main channel and small ancillary abandoned creek channels.

FIRE HISTORY: No evidence of fire within last 20 or more years

OLD-GROWTH CHARACTERISTICS: There are many small standing dead trees, with few older standing dead trees present. Fallen trees and downed large woody debris are found throughout the stand. There is a fairly good representation of different ages of trees, but many trees are probably less that 60 years old. Some older trees are found scattered throughout the stand.

DISTURBANCE HISTORY: Stumps are present indicating previous logging.

UNIQUE CHARACTERISTICS: This is a good example of an older stand of riparian forest along Drake's Creek. It provides a good example of the diversity of forest communities in the Drake's Creek floodplain.

SIGNIFICANCE: This occurrence represents a relatively undisturbed forest on the Vernon District. This forest is one of the best examples of Riparian Forest on this district.

OVERALL NATURAL COMMUNITY QUALITY: A/AB

JUSTIFICATION: Qualities that enhance the ecological value of this forest include uneven-age forest structure with a mostly closed canopy and fairly open midstory, many older trees throughout and a diversity of canopy tree species. The poor qualities of this forest include an overall dominance of young trees less than 60 years old and evidence of previous thinning creating open gaps in the canopy and a thick midstory component in places throughout the stand.

VEGETATION:
TRANSECT SAMPLE DATA

OVERSTORY/MIDSTORY DBH CLASS DISTRIBUTION*
(inches)

SPECIES	2-5	>5-10	>10-15	>15-20	>20-25	>25-30	>30-35	>35
Liquidambar styraciflua	8	3	1					
Magnolia virginiana	4	4						
Ilex opaca	4							
Fagus grandifolia			1	1				
Acer rubrum	11	1						
Quercus alba					1			
Nyssa biflora	9	1						
Pinus taeda					1	1		
Quercus nigra			2	3				
Quercus laurifolia	1		2	2				
Quercus michauxii			1					
Quercus phellos			1	1				

*number of stems given in each dbh class.

PERCENT WOODY COVER BY PLOT*

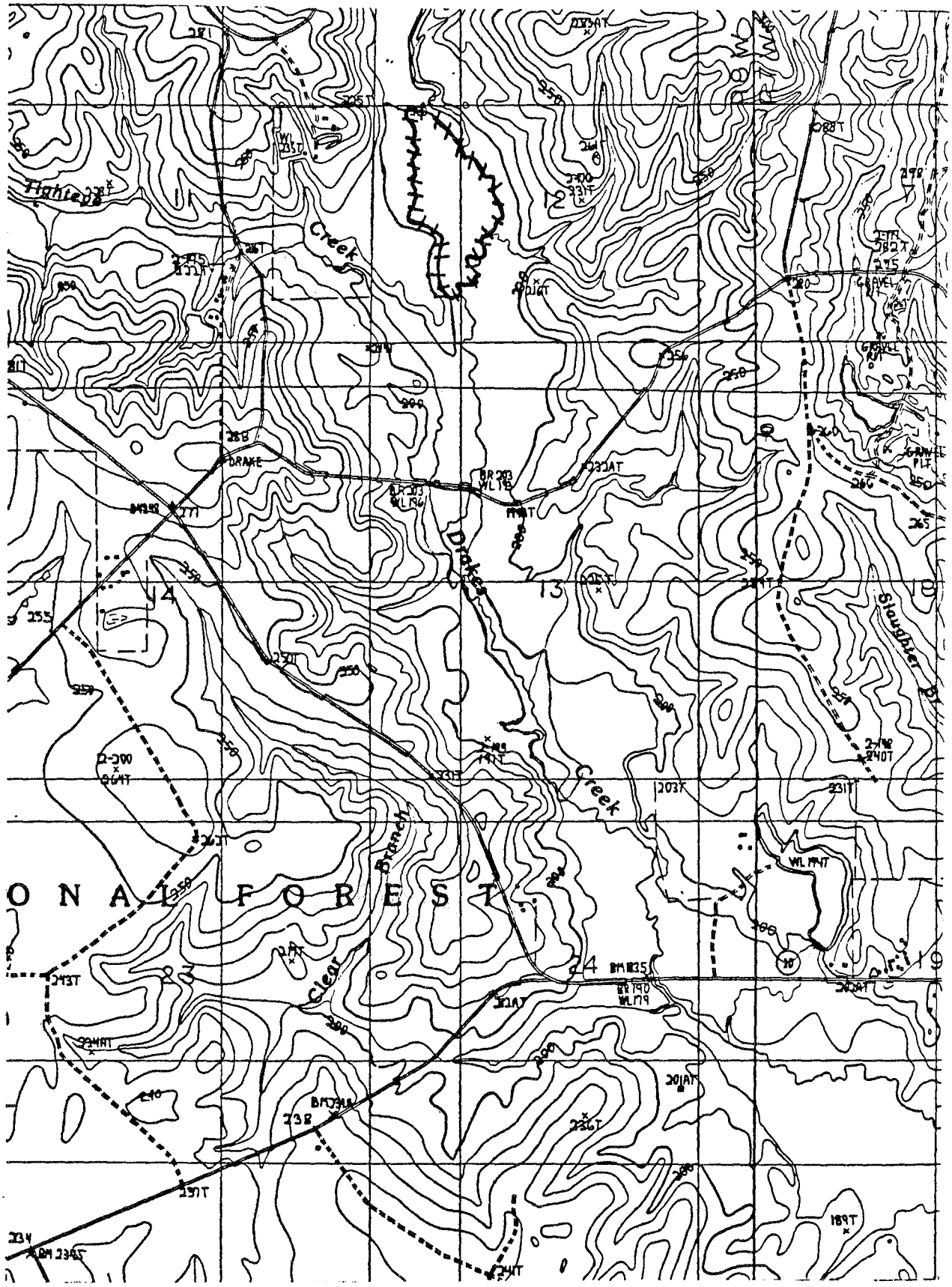
SPECIES (woody)	PLOT 1	PLOT 2	PLOT 3	PLOT 4	PLOT 5
Ilex opaca	10-25	<5		<5	
Magnolia virginiana	5-10				10-25
Vaccinium arboreum	<5				
Vaccinium elliottii	<5	10-25	25-50	5-10	<5
Acer rubrum	5-10		5-10		<5
Hamamelis virginiana		5-10			
Symplocos tinctoria		5-10			
Quercus phellos		<5			
Nyssa biflora			<5	5-10	<5
Quercus spp.			10-25		25-50
Rhododendron sp.			<5		
Bignonia capreolata				<5	
Rubus sp.				<5	

*includes all woody plants and vines < 2 inches in dbh. Cover classes include <5%, 5-10%, 10-25%, 25-50%, 50-75%, and >75%.

PERCENT HERBACEOUS COVER BY PLOT*

SPECIES (herbs)	PLOT 1	PLOT 2	PLOT 3	PLOT 4	PLOT 5
Dichanthelium boscii	5-10	<5		<5	<5
Chasmanthium sp.	25-50	10-25	10-25	5-10	5-10
Carex spp.	5-10	5-10	5-10	5-10	<5
Sphagnum spp.	<5	<5		<5	<5
Viola spp.			<5		
Mitchella repens	<5	<5	<5		
Hypericum spp.			<5	<5	<5

*cover classes include <5%, 5-10%, 10-25%, 25-50%, 50-75%, and >75%.


Creek
Drake
Slaughter
Creek
Branch
Clear
ONAL FOREST
DRAKE
GRAVEL PIT
WL PMT
BM 2345
BM 1835

SITE NAME: Whiskey Chitto Bottoms

LNHP TYPE: Riparian Forest
USFS TYPE: Sweetgum-Nuttall Oak-Willow-Oak, Immature Sawtimber (62-12)

QUAD: Birds Creek, LA
COMPARTMENT: 20
STAND: 22
TRS: T1S, R7W, SECT 3
DISTANCE AND DIRECTION OF NEAREST TOWN: Sugrue is approximately 3 miles southeast

GENERAL DESCRIPTION: This is a high quality riparian forest dominated in the canopy by loblolly pine, sweetgum, white oak, southern magnolia, and American beech. It has a well developed midstory with dogwood, ironwood, red maple, southern magnolia, American beech, hickory, horse sugar, witch hazel, and sweetgum of various sizes and ages. The understory is very sparse, comprised of small saplings, and many vines such as muscadine and green briars. Sedges, partridge-berry and spangle-grasses characterize the sparse herbaceous layer.

APPEARANCE: This stand has a closed canopy with a fairly open midstory component and a very sparse understory and herbaceous layer.

USFS STAND AGE: 1921, 74 years

ACREAGE OF OCCURRENCE: Approximately 80 acres

SETTING (TOPOGRAPHY, GEOLOGY, SOILS): This occurrence is located along the western banks of Whiskey Chitto Creek. The topography is relatively flat except near meandering tributaries and the stream channel of Whiskey Chitto Creek. The elevation of this occurrence is approximately 190 to 200 feet. It is found associated with Guyton soils, a typical silty loam, poorly drained soil of Holocene alluvium.

FIRE HISTORY: No evidence of fire within the last 20 or more years

OLD-GROWTH CHARACTERISTICS: Old-growth characteristics include numerous standing dead trees, an open midstory, large canopy trees, many fallen logs and downed woody debris, many large vines and large midstory trees (dogwoods, horse sugar, red maples).

DISTURBANCE HISTORY: Little evidence of disturbance. No roads, no firebreaks, and no stumps evident.

UNIQUE CHARACTERISTICS: Many large canopy trees including loblolly pines and American beech trees. Also many large midstory trees such as dogwoods and horse sugar.

SIGNIFICANCE: Very little disturbance, good example of riparian forest.

OVERALL NATURAL COMMUNITY QUALITY: AB/B

JUSTIFICATION: This forest has many older trees. It is, in general, a closed canopy community with a well-developed midstory. A good example of an older riparian forest, however, there are many areas of thick midstory where some thinning has occurred along the edges of the occurrence and where the average age of canopy trees is fairly young (less than 60 years old).

VEGETATION:
TRANSECT SAMPLE DATA

OVERSTORY/MIDSTORY DBH CLASS DISTRIBUTION*
(inches)

SPECIES	2-5	>5-10	>10-15	>15-20	>20-25	>25-30	>30-35	>35
Magnolia grandiflora				2		1		
Nyssa biflora	1			1				
Fagus grandifolia		1		1	1			
Cornus florida	7							
Liquidambar styraciflua	2	4	4	1				
Pinus taeda		1	5	5	7			
Acer rubrum		4						
Carpinus caroliniana	1							
Carya sp.		1						

*number of stems given in each dbh class.

PERCENT WOODY COVER BY PLOT*

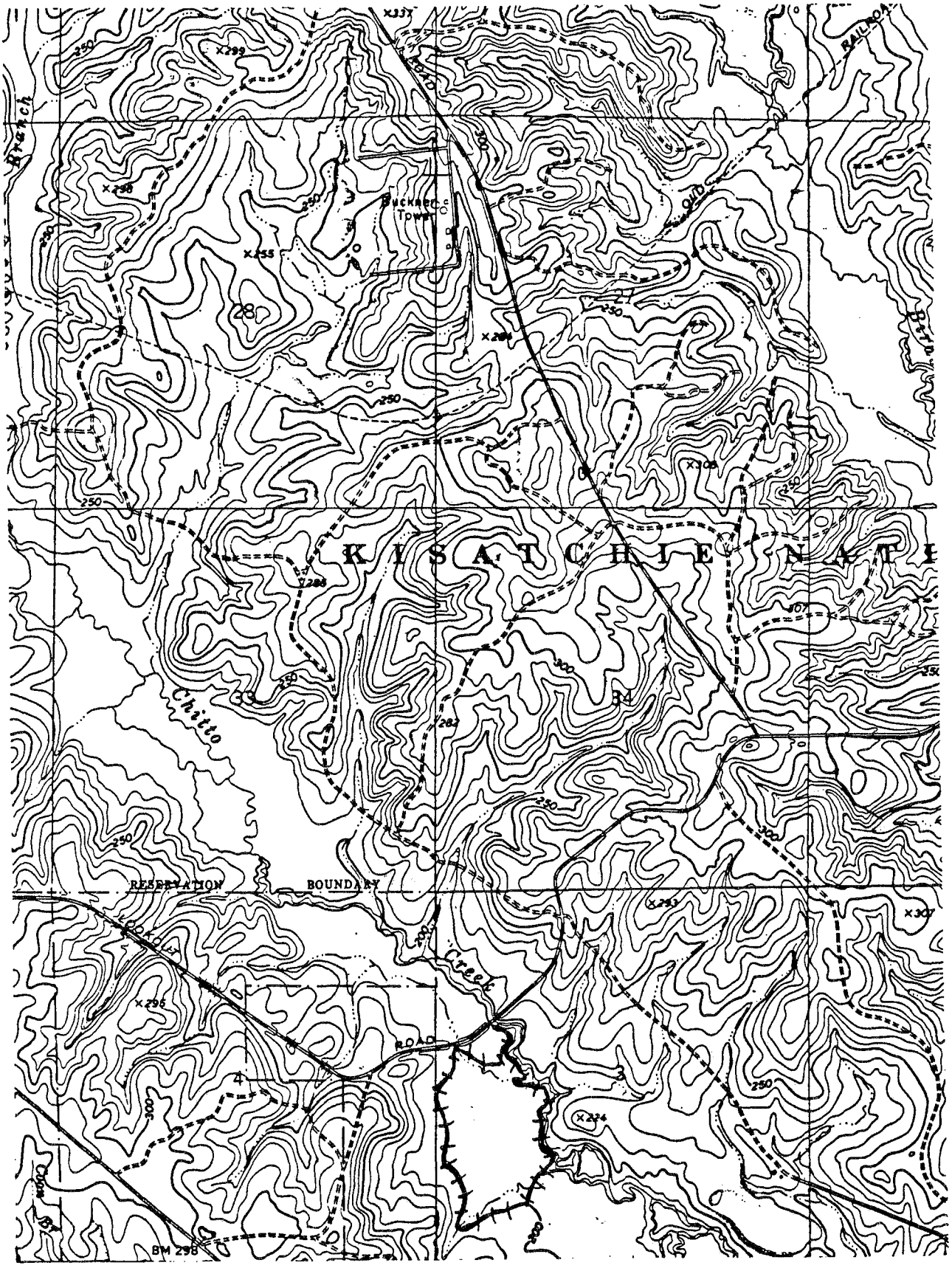
SPECIES (woody)	PLOT 1	PLOT 2	PLOT 3	PLOT 4	PLOT 5
Carpinus caroliniana	5-10	<5	5-10	10-25	<5
Vitis rotundifolia	5-10		10-25		
Symplocos tinctoria	5-10				
Callicarpa americana	5-10	<5			<5
Smilax glauca	5-10	<5	10-25	25-50	10-25
Quercus laurifolia		<5	<5		5-10
Quercus phellos		<5			
Magnolia grandiflora				<5	
Ilex opaca				<5	
Cornus florida					5-10
Acer rubrum			<5	5-10	

*includes all woody plants and vines < 2 inches in dbh. Cover classes include <5%, 5-10%, 10-25%, 25-50%, 50-75%, and >75%.

PERCENT HERBACEOUS COVER BY PLOT*

SPECIES (herbs)	PLOT 1	PLOT 2	PLOT 3	PLOT 4	PLOT 5
Chasmanthium sp.	<5	5-10	<5	<5	<5
Mitchella repens	<5	<5	<5	<5	<5
Carex spp.	<5	<5	<5	<5	<5
Panicum spp.	<5	<5			<5
Elephantopus sp.			<5	<5	
Polystichum acrostichoides				<5	
Chasmanthium latifolium	<5	<5	<5		<5

*cover classes include <5%, 5-10%, 10-25%, 25-50%, 50-75%, and >75%.


Branch
ROAD
RAILROAD
OLD
Buckhorn Tower
K I S A T C H I E N A T I
Chitto
RESERVATION
BOUNDARY
Creek
ROAD
BM 298

SITE NAME: Black Branch Bottoms

LNHP TYPE: Mixed Hardwood-Loblolly Forest
USFS TYPE: White Oak-Northern Red Oak-Hickory, Immature Sawtimber (53-12)

QUAD: Sugrue, LA
COMPARTMENT: 18
STAND: 8
TRS: T1S, R7W, SECT 32
DISTANCE AND DIRECTION OF NEAREST TOWN: Sugrue is 2.5 miles northeast
GENERAL DESCRIPTION: The canopy of this forest is dominated by southern red and white oaks, loblolly pines, hickory, sweetgum, and American beech. There is a fairly open midstory that is dominated by witch hazel, red maple, dogwood, hickory saplings, oak saplings, huckleberries, and other canopy saplings. There is a very sparse understory and herbaceous component that includes elephant's-foot, spangle-grasses, sedges, partridge-berry, panic grasses, and bracken fern.

APPEARANCE: The structure of this stand is composed of a closed canopy with a fairly open midstory and little to no herbaceous component.

USFS STAND AGE: 1933, 62 years

ACREAGE OF OCCURRENCE: Approximately 80 acres

SETTING (TOPOGRAPHY, GEOLOGY, SOILS): This forest is located along the banks of Black Branch, a small tributary that leads into Drake's Creek. It is located at about 180 feet elevation in mostly flat topography; steep banks (about 8-10 feet high) are present along the channel of Black Branch. The majority of this occurrence is found on Gore soil (composed of poorly drained fine sandy loam) but grades into Guyton soil (silty loam) closer to the banks of Black Branch.

FIRE HISTORY: No evidence of fire within last 20 or more years

OLD-GROWTH CHARACTERISTICS: There are not many large standing dead trees; most dead trees are young trees 2-6 inches in diameter. There are some canopy gaps present but they are very small. There is considerable large woody debris present throughout the site. There is also a good representation of different age classes of the canopy species. There are many older loblolly pines that probably exceed 100 years in age. Some older American beech and oaks are present.

DISTURBANCE HISTORY: A minor wind storm caused several downed trees in a small portion of the area. There is evidence of previous timber removal (as indicated by stumps), and some fire breaks were created in the past to prevent fires from crossing into adjacent private lands.

SIGNIFICANCE: The evidence of little disturbance, high species diversity, and amount of older canopy trees make this occurrence one of few good examples of mature mixed hardwood-loblolly forest on the Vernon District.

OVERALL NATURAL COMMUNITY QUALITY: A/AB

JUSTIFICATION: Qualities that enhance the ecological value of this forest include the presence of many older canopy trees, uneven-age forest structure with closed canopy and open midstory, and high diversity of canopy species. Negative features of this stand include some edge effect from adjacent clearings, presence of a road along the north edge and some evidence of recent disturbance (fire breaks, stumps).

VEGETATION:
TRANSECT SAMPLE DATA

OVERSTORY/MIDSTORY DBH CLASS DISTRIBUTION*
(inches)

SPECIES	2-5	>5-10	>10-15	>15-20	>20-25	>25-30	>30-35	>35
Quercus alba	2	1	2	1				
Carya alba	5	6	1	1				
Nyssa sylvatica	4	2						
Quercus falcata		1	5		1			
Liquidambar styraciflua	9	3						
Acer rubrum	3	2						
Carya sp.		2		1				
Hamamelis virginiana	5							
Cornus florida	7	1						
Pinus taeda	2	3	1	1		1		
Fagus grandifolia	3			2				
Vaccinium arboreum	4							

*number of stems given in each dbh class.

PERCENT WOODY COVER BY PLOT*

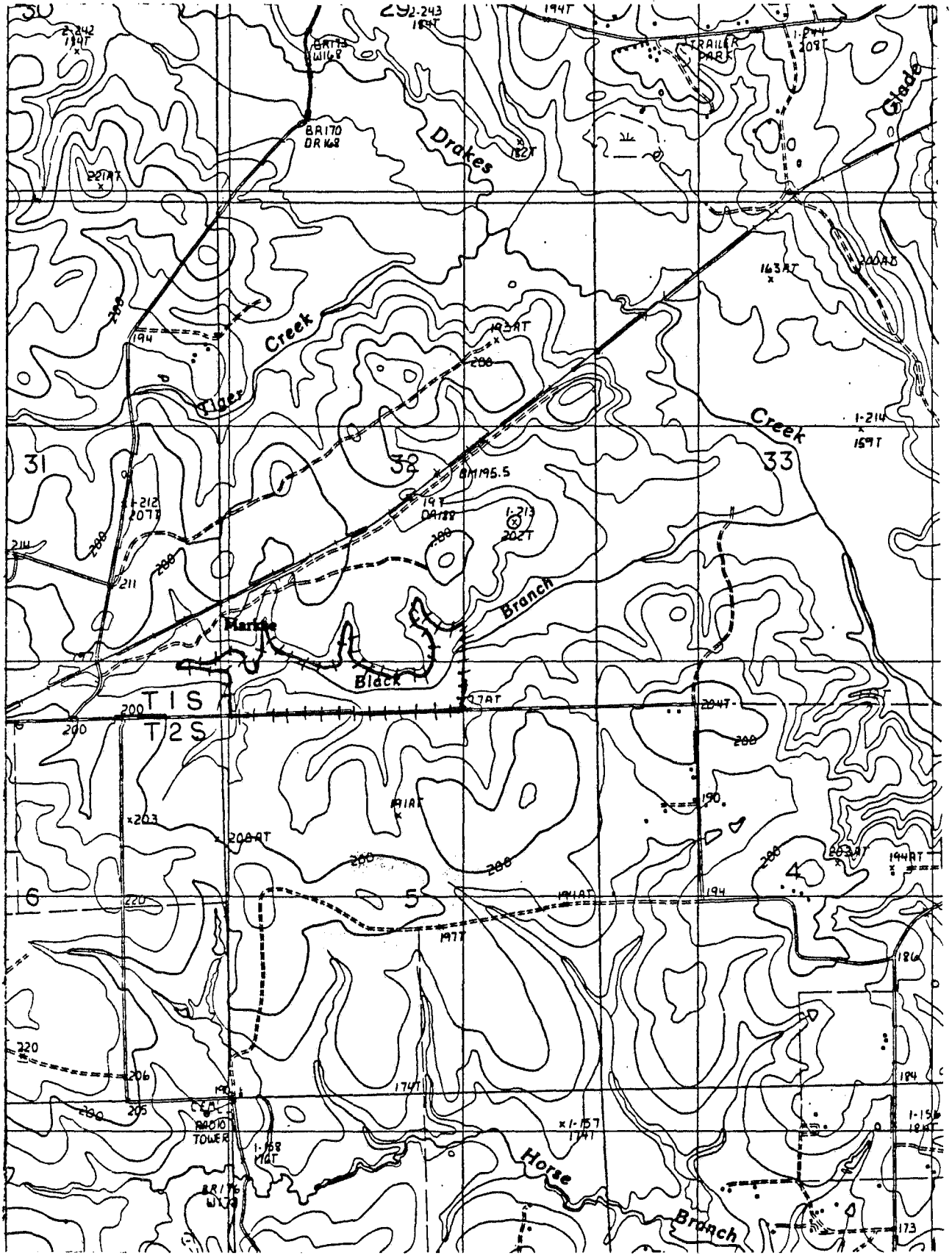
SPECIES (woody)	PLOT 1	PLOT 2	PLOT 3	PLOT 4	PLOT 5
Hamamelis virginiana	10-25	<5		5-10	<5
Vitis rotundifolia	5-10				
Smilax rotundifolia	<5				<5
Smilax glauca	<5			5-10	
Vaccinium elliottii	<5		<5		<5
Callicarpa americana		<5	<5		
Cornus florida		50-75		25-50	5-10
Vaccinium stamineum		5-10			
Liquidambar styraciflua		5-10			
Vaccinium amoenum			<5		
Vaccinium arboreum			<5	5-10	
Carya sp.			<5		
Acer rubrum				5-10	
Fagus grandifolia					10-25

*includes all woody plants and vines < 2 inches in dbh. Cover classes include <5%, 5-10%, 10-25%, 25-50%, 50-75%, and >75%.

PERCENT HERBACEOUS COVER BY PLOT*

SPECIES (herbs)	PLOT 1	PLOT 2	PLOT 3	PLOT 4	PLOT 5
Elephantopus tomentosa	5-10	<5	<5	<5	5-10
Chasmanthium sp.	10-25	<5	<5	<5	<5
Carex spp.	<5	<5			<5
Mitchella repens	5-10	5-10	<5	<5	<5
Panicum spp.	<5	<5	<5	<5	<5
Pteridium aquilinum			<5	<5	

*cover classes include <5%, 5-10%, 10-25%, 25-50%, 50-75%, and >75%.


Drakes
Glade
Creek
Kiger
Creek
Black
Branch
Horse
Branch
Marble
TRAILER PARK
RADIO TOWER
31
32
33
6
5
4
T1S
T2S

SITE NAME: Drake's Creek Beech Woods

LNHP TYPE: Mixed Hardwood-Loblolly Forest
USFS TYPE: Bottomland Hardwood-Loblolly Pine, Immature Sawtimber (46-12)

QUAD: Sugrue, LA
COMPARTMENT: 18
STAND: 19
TRS: T1S, R7W, SECT 29
DISTANCE AND DIRECTION OF NEAREST TOWN: Sugrue is 4 miles northeast

GENERAL DESCRIPTION: This is a closed canopy forest dominated by American beech, white oak, and loblolly pine. The open midstory is composed of canopy saplings, witch hazel, huckleberries, dogwood, red maple, American holly, and sassafras. There is a sparse herbaceous layer dominated by partridge-berry with minor components of spangle-grasses, elephant's-foot, panic grasses, sedges, and some ferns.

APPEARANCE: This is a well-structured mature forest composed of a closed canopy of large trees, an open diverse midstory and a sparse understory and herbaceous layer.

USFS STAND AGE: 1897, 98 years

ACREAGE OF OCCURRENCE: 20 acres

SETTING (TOPOGRAPHY, GEOLOGY, SOILS): This mixed hardwood-loblolly pine forest occurs along a slope that grades into a bayhead swamp area and into Drake's Creek. This occurrence is located at about 170-180 feet in elevation. It is on a small slope that follows parallel to Drake's Creek. The soil in this occurrence is predominantly Cahaba, a well-drained sandy soil of stream terraces and side slopes of Pleistocene terraces. The topography in this occurrence is gently sloping into the floodplain of Drake's Creek.

FIRE HISTORY: No evidence of fire within the last 20 or more years

OLD-GROWTH CHARACTERISTICS: There are many large standing dead trees, but, there are no large gaps in the canopy. The stand is generally uneven-aged. There is much large woody debris on the forest floor. Many large white oaks and American beech trees are scattered throughout the stand.

DISTURBANCE HISTORY: There is little disturbance in this area, however, some old stumps are present indicating previous timber removal. Some fire breaks are present within the stand. There has been a significant amount of timber removal and clearcutting of adjacent stands.

UNIQUE CHARACTERISTICS: This is a very interesting stand because it so closely resembles a hardwood slope forest. The sloping terrain and presence of large American beech trees make this area unique on the Vernon District.

SIGNIFICANCE: This occurrence is a high quality old forest and a good example of the variation of mixed hardwood-loblolly pine forests on the Vernon District.

OVERALL NATURAL COMMUNITY QUALITY: A/AB

JUSTIFICATION: Qualities that enhance the ecological value of this forest include the abundance of older dominant canopy species, diversity of canopy and midstory species, and closed canopy condition with open midstory aspect. The poor qualities of this stand include the limited size of the occurrence and significant impacts from adjacent stand clearings.

VEGETATION:
TRANSECT SAMPLE DATA

OVERSTORY/MIDSTORY DBH CLASS DISTRIBUTION*
(inches)

SPECIES	2-5	>5-10	>10-15	>15-20	>20-25	>25-30	>30-35	>35
Quercus alba	4	2	4	4	1			
Vaccinium arboreum	4							
Acer rubrum	4	1	1					
Carya sp.	4							
Liquidambar styraciflua	3							
Hamamelis virginiana	10							
Quercus falcata			1					
Cornus florida	5							
Pinus taeda		1	2					
Sassafras albidum		2						
Ilex opaca	6							
Fagus grandifolia			1	1	2			

*number of stems given in each dbh class.

PERCENT WOODY COVER BY PLOT*

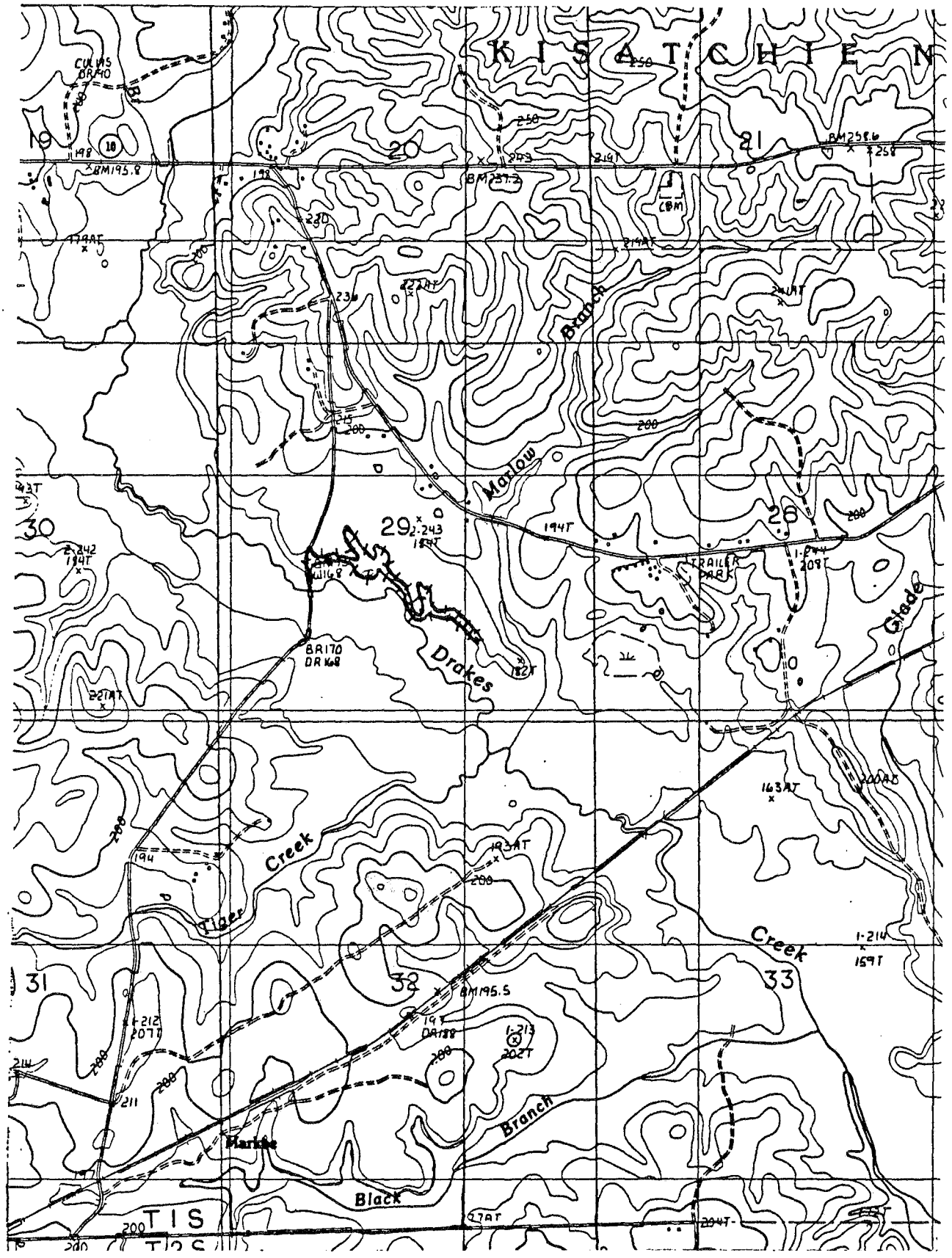
SPECIES (woody)	PLOT 1	PLOT 2	PLOT 3	PLOT 4	PLOT 5
Vaccinium elliottii	5-10	5-10	5-10	<5	
Hamamelis virginiana	25-50	10-25	50-75	25-50	25-50
Smilax glauca	10-25		<5	10-25	<5
Fagus grandifolia	5-10				
Quercus alba	<5				
Smilax bona-nox		5-10			
Halesia sp.		<5			
Asimina triloba		<5			
Ilex opaca			5-10	<5	
Vaccinium sp.			5-10	5-10	5-10
Viburnum dentatum					25-50
Symplocos tinctoria					<5

*includes all woody plants and vines < 2 inches in dbh. Cover classes include <5%, 5-10%, 10-25%, 25-50%, 50-75%, and >75%.

PERCENT HERBACEOUS COVER BY PLOT*

SPECIES (herbs)	PLOT 1	PLOT 2	PLOT 3	PLOT 4	PLOT 5
Mitchella repens	<5	<5	5-10	5-10	<5
Chasmanthium sp.	<5	<5	<5	<5	<5
Elephantopus caroliniana	<5		<5		<5
Sphagnum spp.	<5	<5		<5	
Osmunda regalis	<5			<5	
Panicum spp.		<5			<5
Aristolochia sp.		<5			
Carex spp.			<5	<5	<5
Scutellaria integrifolia			<5		

*cover classes include <5%, 5-10%, 10-25%, 25-50%, 50-75%, and >75%.


KISATCHIE
CULVAS BRAN
BM195.8
BM257.2
BM258.6
Branch
Marlow
TRAILER PARK
Drakes
Glade
Creek
Tiger
Creek
Black
Branch
Markle
T1S
T2S
19
20
21
30
29
28
31
32
33

SITE NAME: Big Branch Longleaf

LNHP TYPE: Upland Longleaf Pine Forest, West Gulf Coastal Plain
USFS TYPE: Longleaf Pine, Immature Pole Timber (21-11)

QUAD: Birds Creek, LA
COMPARTMENT: 14
STAND: 4
TRS: T1S, R7W, SECT 5
DISTANCE AND DIRECTION OF NEAREST TOWN: Cravens is 4.5 miles southeast

GENERAL DESCRIPTION: An open, longleaf pine forest in gently rolling terrain dominated by longleaf pine in the canopy. Some small dogwoods, yaupon, and southern red oaks are found scattered throughout the midstory. The understory is dominated by tree huckleberry, sumac, and sassafras. The herbaceous layer is diverse and is dominated by little bluestem, legumes and other grass species.

APPEARANCE: This forest has a very open aspect and is dominated by grasses in the herbaceous layer.

USFS STAND AGE: 1943, 52 years

ACREAGE OF OCCURRENCE: Approximately 250 acres

SETTING (TOPOGRAPHY, GEOLOGY, SOILS): This forest is located in gently rolling hills of the northern portion of the study area. The surface geology of this area is High Pleistocene Terraces. The elevation of this site ranges from 280 feet along the side slopes to 314 feet on the ridgetops. The dominant soil types are Malbis, Ruston and Briley. All these soils are deep well-drained soils of sandy loam or loamy sand that were formed from Pleistocene (Malbis and Ruston) and Tertiary (Briley) sediment deposits.

FIRE HISTORY: High fire frequency, burned once every one to three years. The most recent burn occurred within the last two to three years (1991/1992).

OLD-GROWTH CHARACTERISTICS: This stand exhibits many old-growth characteristics including many standing dead trees, many canopy gaps near older flat-topped longleaf pines, many fallen logs and coarse woody debris on forest floor, numerous age-classes of longleaf pines, a few scattered old damaged trees, few specimens of large hardwoods and little vine growth. The groundcover is dominated by long-lived perennial natives.

DISTURBANCE HISTORY: Old haul roads present, some evidence of timber removal (stumps), some old fire breaks present within the stand.

SIGNIFICANCE: This large stand is an excellent example of longleaf pine forest that is relatively undisturbed.

OVERALL NATURAL COMMUNITY QUALITY: A/AB

JUSTIFICATION: Qualities that enhance the ecological value of this forest include high herb diversity, open community structure, low shrub growth, high fire frequency, some older longleaf pines (greater than 100 years). The poor qualities of this stand include little natural regeneration present, some shrub growth and weedy species in areas of more disturbance.

VEGETATION:
TRANSECT SAMPLE DATA

OVERSTORY/MIDSTORY DBH CLASS DISTRIBUTION*
(inches)

SPECIES	2-5	>5-10	>10-15	>15-20	>20-25	>25-30	>30-35	>35
Pinus palustris		1	5	6				

*number of stems given in each dbh class.

PERCENT WOODY COVER BY PLOT*

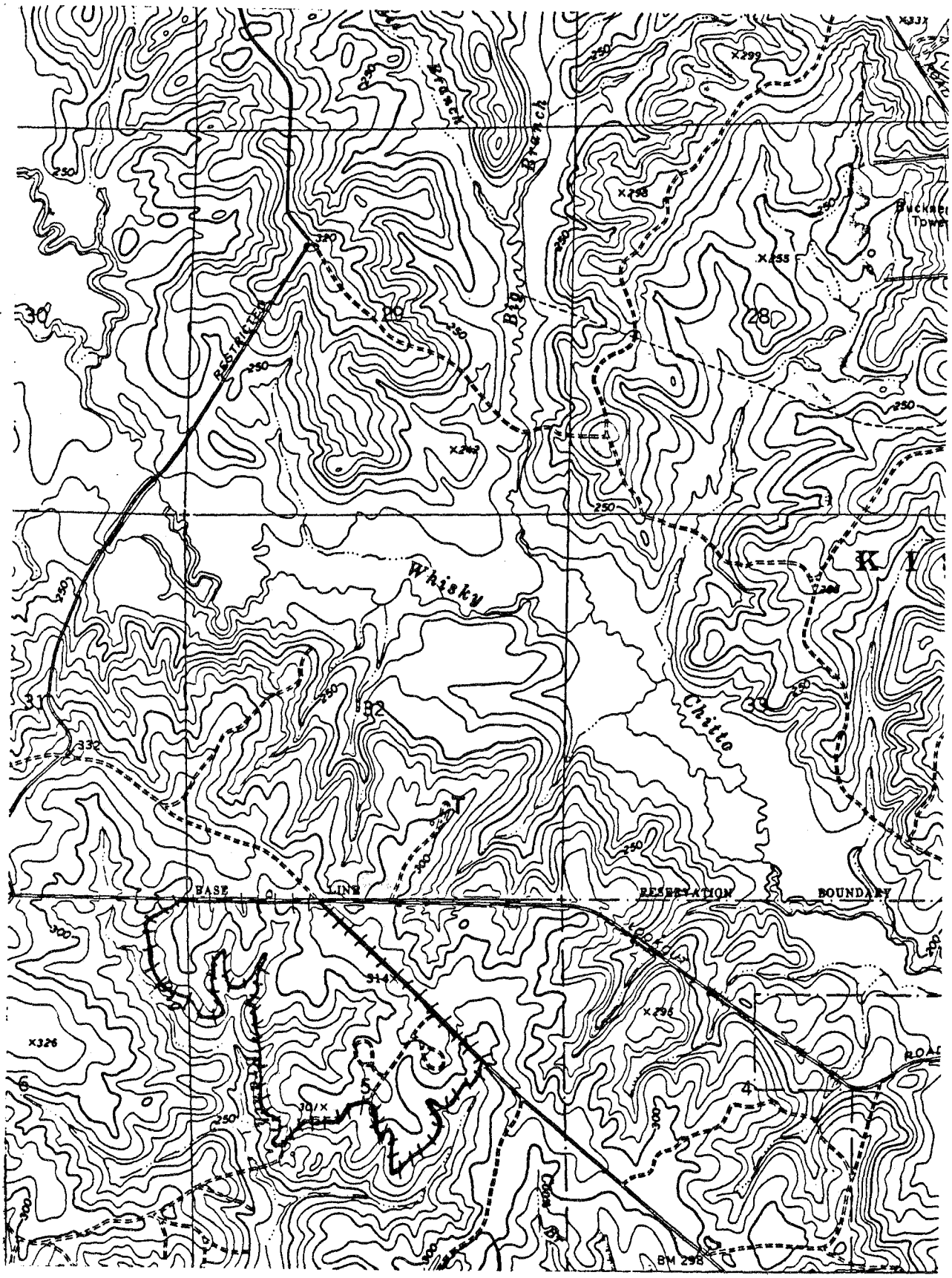
SPECIES (woody)	PLOT 1	PLOT 2	PLOT 3	PLOT 4	PLOT 5
Vaccinium arboreum		<5	<5		<5
Pinus palustris	<5				<5
Rhus copallina	<5	<5	<5	<5	<5
Rhus toxicodendron	<5	<5	<5	<5	
Vaccinium sp.	<5	<5	<5	<5	<5
Rubus sp.	<5	<5	<5	<5	<5
Sassafras albidum				<5	

*includes all woody plants and vines < 2 inches in dbh. Cover classes include <5%, 5-10%, 10-25%, 25-50%, 50-75%, and >75%.

PERCENT HERBACEOUS COVER BY PLOT*

SPECIES (herbs)	PLOT 1	PLOT 2	PLOT 3	PLOT 4	PLOT 5
Schizachyrium scoparium	75-100	75-100	75-100	75-100	75-100
Tephrosia virginiana	<5	<5	5-10	5-10	<5
Schizachyrium tenerum	5-10	5-10	<5	<5	<5
Dichanthelium aciculare	<5	<5		<5	<5
Dichanthelium oligosanthes		<5	<5	<5	<5
Paspalum sp.	<5		<5		

*cover classes include <5%, 5-10%, 10-25%, 25-50%, 50-75%, and >75%


Big Branch
Whisky
Chitto
BASE LINE
RESERVATION BOUNDARY
BM 298

SITE NAME: Coon Branch Longleaf

LNHP TYPE: Upland Longleaf Pine Forest, West Gulf Coastal Plain
USFS TYPE: Longleaf Pine, Immature Sawtimber (21-12)

QUAD: Sugrue, LA, and Birds Creek, LA
COMPARTMENT: 16
STAND: 16
TRS: T1S, R7W, SECTS 5 and 8
DISTANCE AND DIRECTION OF NEAREST TOWN: Sugrue is approximately 5 miles southeast

GENERAL DESCRIPTION: This stand is located in somewhat steeply rolling hills. It includes an area that steeply slopes toward Coon Branch. The forest is characterized by tall longleaf pines and a very open midstory of few smaller longleaf pines, southern red oaks, wax myrtles, tree huckleberry, and post oaks. The woody understory is dominated by huckleberries, poison oak, and green briars. The herbaceous layer is dominated by little bluestem, panic grasses and legumes.

APPEARANCE: This stand has an open midstory and grass dominated herbaceous layer.

USFS STAND AGE: 1923, 62 years

ACREAGE OF OCCURRENCE: Approximately 90 acres

SETTING (TOPOGRAPHY, GEOLOGY, SOILS): This stand is located in steep to gently rolling High Pleistocene Terrace hills. The elevation of this occurrence ranges from 250 feet to 320 feet at its highest point. The dominant soil type is Malbis, a well-drained, sandy loam soil that formed from loamy sediments of Pleistocene-age streams.

FIRE HISTORY: High fire frequency, burned once every three to five years. Most recent burn estimated 1992 or 1993.

OLD-GROWTH CHARACTERISTICS: This stand has many old-growth characteristics including many standing dead trees and much fallen woody debris, many canopy gaps near older trees, a fairly good distribution of age classes with most trees 50-75 years old and a few small patches of younger trees. Some old damaged trees are found throughout (trees greater than 100 years). Very little hardwood growth is found. There is little natural regeneration of longleaf pine.

DISTURBANCE HISTORY: Many old haul roads, fire breaks, and old stumps evident as well as barbed wire fencing and cattle grazing.

SIGNIFICANCE: This is a good example of longleaf pine forest with older trees and open midstory resulting from high fire frequency.

OVERALL NATURAL COMMUNITY QUALITY: A/AB

JUSTIFICATION: Features that make this occurrence ecologically important include old-growth characteristics present, little shrub growth, high fire frequency, diverse herbaceous component, and uneven-age forest structure. The poor qualities of this stand include little natural regeneration of longleaf pine, ground disturbance in places, and some invasion by loblolly pine seedlings.

VEGETATION:
TRANSECT SAMPLE DATA

OVERSTORY/MIDSTORY DBH CLASS DISTRIBUTION*
(inches)

SPECIES	2-5	>5-10	>10-15	>15-20	>20-25	>25-30	>30-35	>35
Pinus palustris	2		4	8				
Quercus falcata	1							

*number of stems given in each dbh class.

PERCENT WOODY COVER BY PLOT*

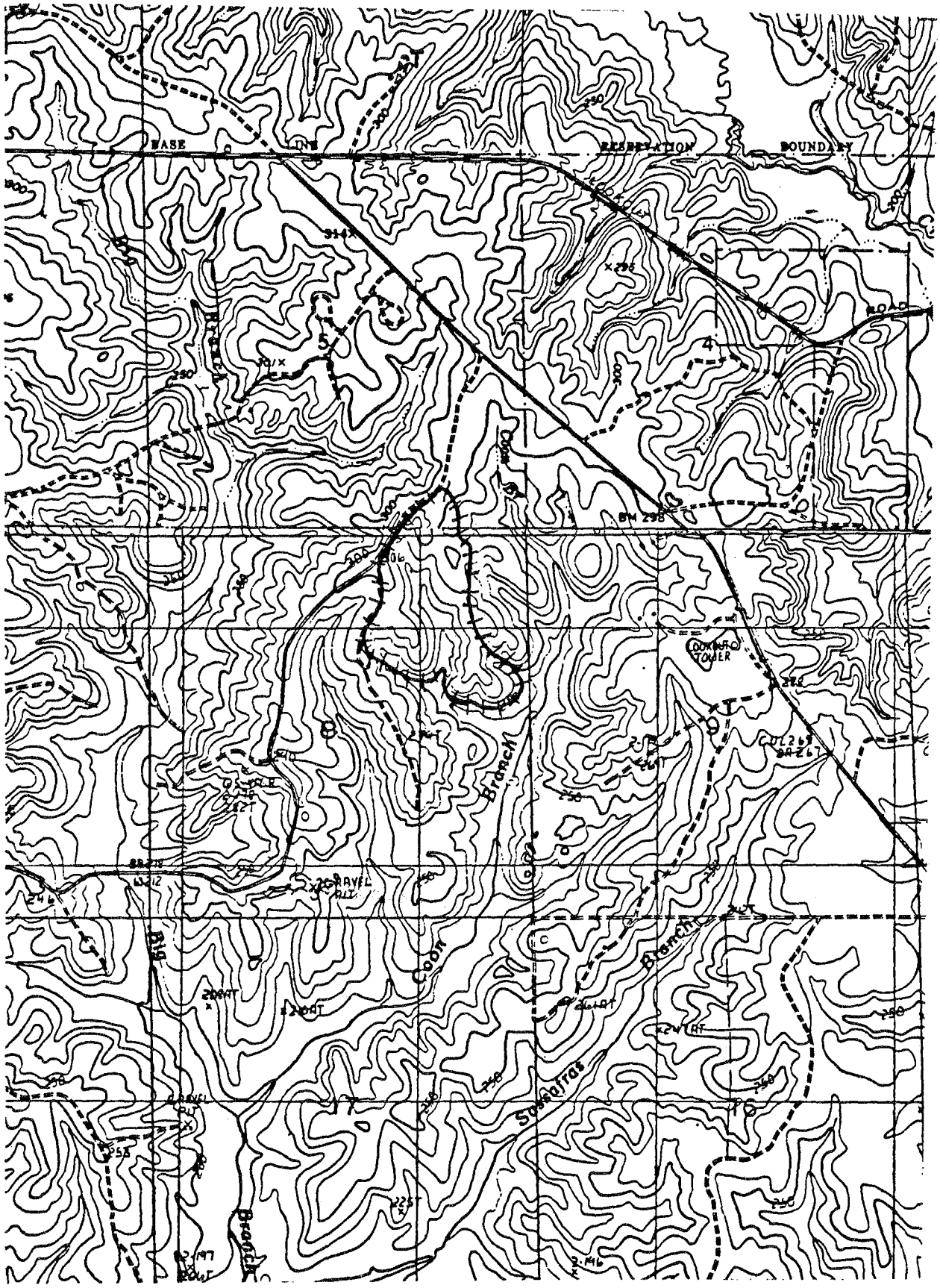
SPECIES (woody)	PLOT 1	PLOT 2	PLOT 3	PLOT 4	PLOT 5
Smilax rotundifolia	<5				<5
Vaccinium arboreum	<5	<5	<5	<5	<5
Quercus falcata	<5				
Baccharis halimifolia	<5				
Rubus sp.		<5		5-10	<5
Rhus toxicodendron	<5			<5	<5
Vaccinium elliottii		<5	<5		
Quercus stellata			<5		
Smilax bona-nox			<5	<5	<5
Pinus palustris		<5	<5		
Myrica cerifera		<5		<5	

*includes all woody plants and vines < 2 inches in dbh. Cover classes include <5%, 5-10%, 10-25%, 25-50%, 50-75%, and >75%

PERCENT HERBACEOUS COVER BY PLOT*

SPECIES (herbs)	PLOT 1	PLOT 2	PLOT 3	PLOT 4	PLOT 5
Schizachyrium scoparium	50-75	10-25	25-50	25-50	10-25
Tephrosia virginiana	<5	<5	<5		<5
Pteridium aquilinum	<5	5-10		<5	5-10
Dichanthelium sp.	<5			<5	<5
Aristida sp.		10-25	5-10	<5	
Schizachyrium tenerum	<5	<5	<5	<5	5-10
Eupatorium sp.			<5		

*cover classes include <5%, 5-10%, 10-25%, 25-50%, 50-75%, and >75%.


BASE
RESERVATION
BOUNDARY
BM 298
Coon Branch
Big
Branch
Sassafras
Branch
LOOKOUT TOWER
GRAVEL PIT

SITE NAME: Birds Creek Uplands

LNHP TYPE: Upland Longleaf Pine Forest, West Gulf Coastal Plain
USFS TYPE: Longleaf Pine, Immature Sawtimber (21-12)

QUAD: Birds Creek, LA
COMPARTMENT: 21
STAND: 3
TRS: T1N, R7W, SECT 35
DISTANCE AND DIRECTION OF NEAREST TOWN: Cravens is 3.8 miles southeast.

GENERAL DESCRIPTION: This forest is located on a ridge top and side slope that is adjacent to small tributaries to Birds Creek. The sideslopes of this ridge are somewhat steep. The forest is dominated by longleaf pine in the canopy. There is little midstory component; small southern red oaks are scattered throughout the stand. Juvenile longleaf pines are present in the midstory and woody understory. In addition, huckleberries, southern magnolia, sumacs, red maple, dogwoods, sweetgum, poison oak and sassafras can be found in the woody understory. The ground cover is dominated by little bluestem, slender bluestem and bracken fern.

APPEARANCE: This is an open stand with tall pines and grass dominated understory.

USFS STAND AGE: 1941, 54 years

ACREAGE OF OCCURRENCE: Approximately 40 acres

SETTING (TOPOGRAPHY, GEOLOGY, SOILS): This occurrence is located in gently rolling terrain, but contains high ridgetops and some steeply forming side slopes. The elevation of this occurrence is 250 to 300 feet on the high ridgetop. The dominant soil type is Ruston fine sandy loam, a deep, well-drained soil.

FIRE HISTORY: This stand undergoes fairly frequent fires, burned once every 3 to 5 years. It appears the most recent burn occurred about 1992 or 1993.

OLD-GROWTH CHARACTERISTICS: There are many old standing dead trees and much fallen woody debris on the forest floor. There are many canopy gaps present near larger pine trees. The forest is relatively even-aged with few older and few younger trees; most trees appear to be 50 to 75 years old. Very little midstory present and little natural regeneration of longleaf pine.

DISTURBANCE HISTORY: Old and new roads are present in site, barbed wire fencing, firebreaks and old large stumps are evident.

SIGNIFICANCE: This area is a good example of longleaf pine forest with high fire frequency and high herbaceous species diversity.

OVERALL NATURAL COMMUNITY QUALITY:A/AB

JUSTIFICATION: Features that make this occurrence ecologically important include old-growth characteristics, a diverse herbaceous layer, and high fire frequency. Significant effects of previous disturbances, the even-age distribution of trees and very little natural regeneration of longleaf pine detract from the quality of this stand.

VEGETATION:
TRANSECT SAMPLE DATA

OVERSTORY/MIDSTORY DBH CLASS DISTRIBUTION*
(inches)

SPECIES	2-5	>5-10	>10-15	>15-20	>20-25	>25-30	>30-35	>35
Pinus palustris				10		1		

*number of stems given in each dbh class.

PERCENT WOODY COVER BY PLOT*

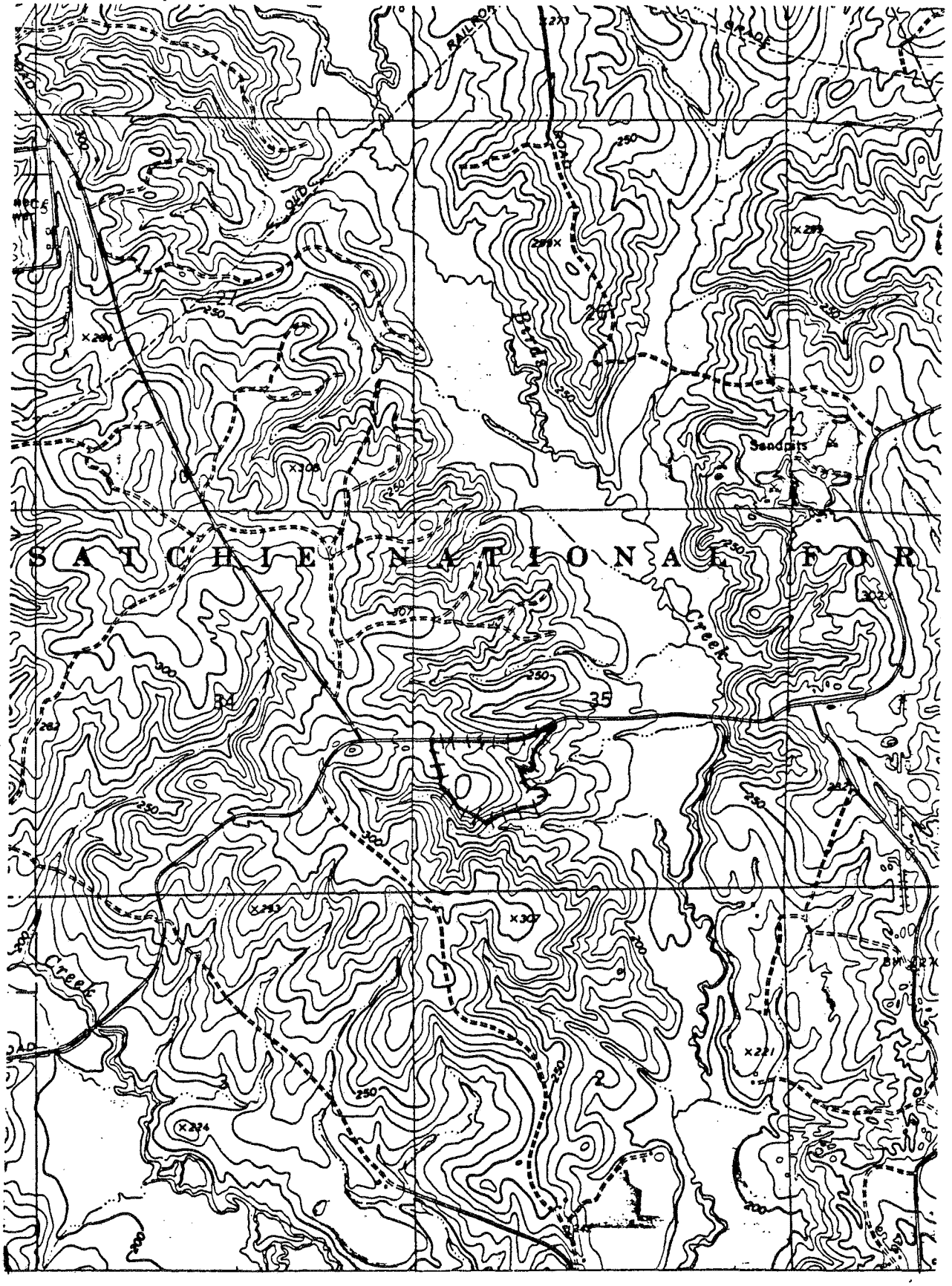
SPECIES (woody)	PLOT 1	PLOT 2	PLOT 3	PLOT 4	PLOT 5
Rhus toxicodendron	10-25	<5	10-25	<5	<5
Vaccinium arboreum	<5	<5			<5
Vaccinium sp.	<5	<5	<5	<5	
Magnolia grandiflora	<5		<5		
Rhus copallina		<5	<5		10-25
Cornus florida			<5	<5	
Rubus sp.	<5	<5		<5	<5
Pinus palustris					<5
Acer rubrum				<5	

*includes all woody plants and vines < 2 inches in dbh. Cover classes include <5%, 5-10%, 10-25%, 25-50%, 50-75%, and >75%.

PERCENT HERBACEOUS COVER BY PLOT*

SPECIES (herbs)	PLOT 1	PLOT 2	PLOT 3	PLOT 4	PLOT 5
Schizachyrium scoparium	10-25	10-25	10-25	50-75	25-50
Cnidoscolus texanus	5-10		<5		<5
Pteridium aquilinum	10-25	25-50	25-50	10-25	<5
Schizachyrium tenerum	5-10	<5			<5
Pityopsis graminifolia	<5	5-10	5-10	5-10	<5
Muhlenbergia expansa		5-10			
Panicum spp.			<5	<5	
Silphium sp.				<5	

*cover classes include <5%, 5-10%, 10-25%, 25-50%, 50-75%, and >75%.


SATCHIE NATIONAL FOR
Sandpits
Creek
Creek
35
34

SITE NAME: Sixmile Creek Longleaf

LNHP TYPE: Upland Longleaf Pine Forest, West Gulf Coastal Plain
USFS TYPE: Longleaf Pine, Immature Sawtimber (21-12)

QUAD: Bird's Creek, LA
COMPARTMENT: 25
STAND: 10
TRS: T1N, R6W, SECT 29
DISTANCE AND DIRECTION OF NEAREST TOWN: Fullerton is 4.9 miles southeast

GENERAL DESCRIPTION: This longleaf pine forest is on a high dry ridgetop that has longleaf pine; hillside bogs are included on slopes. The slopes are somewhat steep for this generally gently rolling terrain. The forest canopy consists solely of longleaf pine with no midstory component except scattered small longleaf pine trees. Most shrubs and young trees are less than one meter tall and include sumac, waxmyrtle, tree huckleberry, and juvenile longleaf pines. The ground cover is quite diverse and is composed of bracken fern, little bluestem and other grasses, silk-grass, legumes, poison oak, and others.

APPEARANCE: This stand has tall canopy pines, an open midstory, and a grass and bracken fern dominated ground cover.

USFS STAND AGE: 1920, 75 years

ACREAGE OF OCCURRENCE: 10 acres

SETTING (TOPOGRAPHY, GEOLOGY, SOILS): This occurrence is located on a high ridge top with fairly steep side slopes that support hillside bogs. The elevation of this site is 300-315 feet, one of the highest elevations of this area. The dominant soil type is Malbis, a well-drained fine sandy loam that formed in loamy sediments of Pleistocene-age streams.

FIRE HISTORY: High fire frequency, burned once every one to three years. It appears the most recent burn occurred in 1994.

OLD-GROWTH CHARACTERISTICS: Old-growth characteristics include many standing dead trees, a few fallen logs, and a few older trees over 100 years. Some canopy gaps are present.

DISTURBANCE HISTORY: Little evidence of mechanical disturbance though some previous timber removal has occurred as evidenced by stumps. An active road passes through occurrence. There are no evident fire breaks.

SIGNIFICANCE: This forest supports older longleaf pine, hillside seepage bogs and Red-cockaded Woodpeckers.

OVERALL NATURAL COMMUNITY QUALITY: AB/B

JUSTIFICATION: Features that make this forest ecologically important include the presence of some older longleaf pines, a good diversity of herbs, high fire frequency, and uneven-age forest structure. This stand, however, has very little natural regeneration and may be adversely affected by the road crossing through the stand.

VEGETATION:
TRANSECT SAMPLE DATA

OVERSTORY/MIDSTORY DBH CLASS DISTRIBUTION*
(inches)

SPECIES	2-5	>5-10	>10-15	>15-20	>20-25	>25-30	>30-35	>35
Pinus palustris			5	5				

*number of stems given in each dbh class.

PERCENT WOODY COVER BY PLOT*

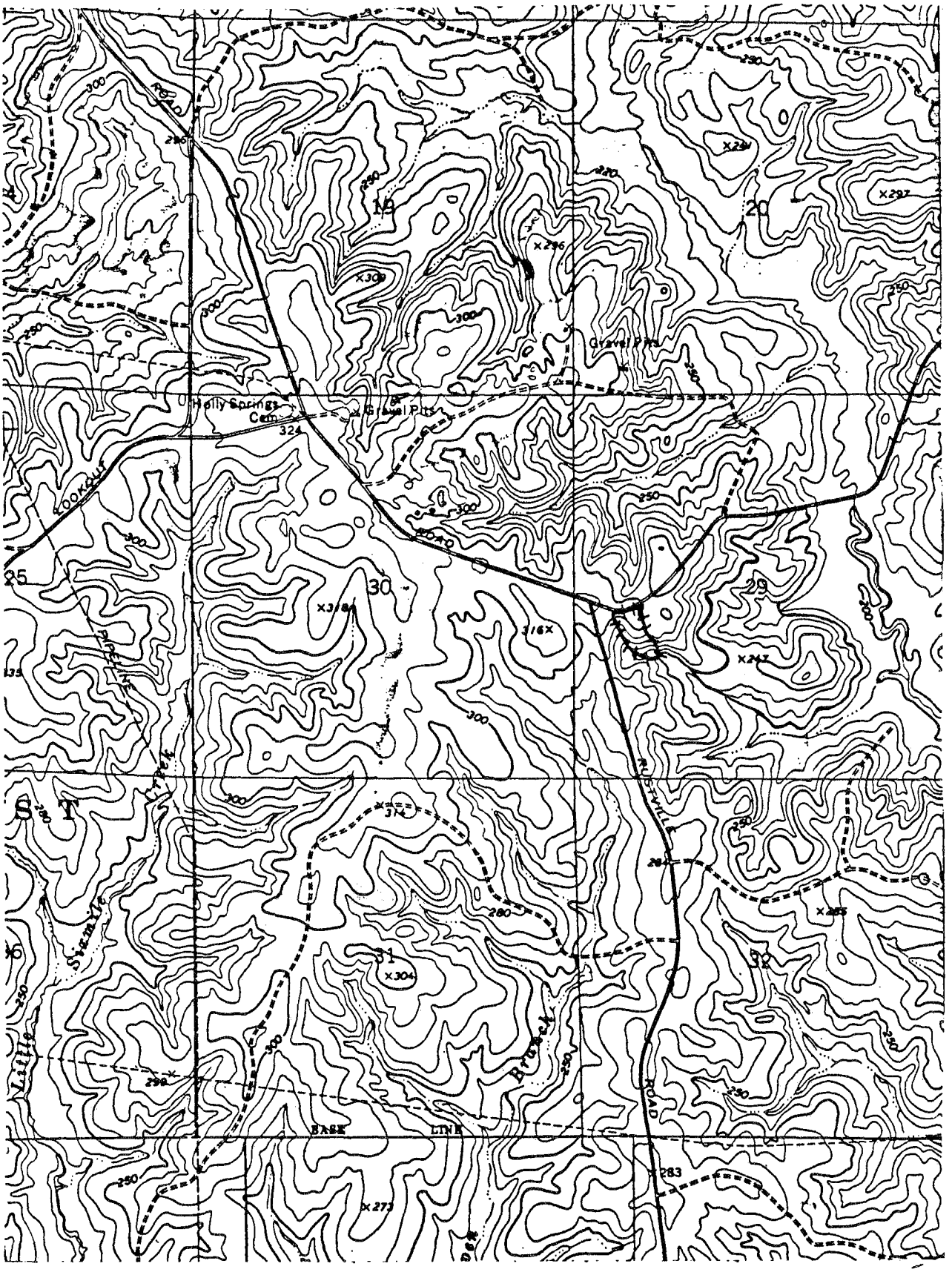
SPECIES (woody)	PLOT 1	PLOT 2	PLOT 3	PLOT 4	PLOT 5
Rhus copallina	<5	<5	<5	<5	5-10
Callicarpa americana	<5	<5			<5
Sassafras albidum	<5				
Smilax bona-nox	<5	<5		<5	
Quercus falcata		<5	<5		<5
Pinus palustris		<5	<5	5-10	
Vaccinium arboreum			<5	<5	<5
Rhus toxicodendron	5-10		10-25	10-25	5-10

*includes all woody plants and vines < 2 inches in dbh. Cover classes include <5%, 5-10%, 10-25%, 25-50%, 50-75%, and >75%.

PERCENT HERBACEOUS COVER BY PLOT*

SPECIES (herbs)	PLOT 1	PLOT 2	PLOT 3	PLOT 4	PLOT 5
Pteridium aquilinum	25-50	>75	10-25	<5	<5
Schizachyrium scoparium	10-25	<5	<5	25-50	25-50
Cnidoscolus texanus	5-10	<5	5-10	5-10	<5
Pityopsis graminifolia	5-10	5-10		5-10	10-25
Tephrosia virginiana	<5	<5	<5	5-10	<5
Eryngium yuccifolium			<5		

*cover classes include <5%, 5-10%, 10-25%, 25-50%, 50-75%, and >75%.


Holly Springs Cem.
Gravel Pits
Gravel Pits
Little Sioux Creek
Brush Creek
RUSTVILLE ROAD
BASE LINE
19
20
25
30
29
31
32
T
S

SITE NAME: Sixmile Uplands

LNHP TYPE: Upland Longleaf Pine Forest, West Gulf Coastal Plain
USFS TYPE: Longleaf Pine, Immature Sawtimber (21-12)

QUAD: Bird's Creek, LA
COMPARTMENT: 25
STAND: 1
TRS: T1N, R6W, SECT 29
DISTANCE AND DIRECTION OF NEAREST TOWN: Fullerton is 4.9 miles southeast

GENERAL DESCRIPTION: The forest is dominated by longleaf pine with an open midstory and few hardwoods present (small blackjack oaks). Many juvenile longleaf pines are in the midstory and understory. The ground cover is very dense and dominated by little bluestem, slender bluestem, other grasses, bracken fern, and legumes. Hillside bogs are scattered.

APPEARANCE: This stand is a very open forest dominated by tall pines, with a continuous herbaceous layer.

USFS STAND AGE: 1946, 49 years

ACREAGE OF OCCURRENCE: 102 acres

SETTING (TOPOGRAPHY, GEOLOGY, SOILS): This occurrence is located in gently rolling terrain west of Sixmile Creek and is dissected by small creeks. The elevation ranges from 220 to 260 feet. The dominant soil type of this area is Briley, a deep, well-drained loamy sand formed from sediments of Tertiary age.

FIRE HISTORY: High fire frequency, burned once every three to five years. It appears the most recent burn occurred in 1994.

OLD-GROWTH CHARACTERISTICS: This stand exhibits some old-growth characteristics such as the presence of a few standing dead trees, woody debris present, uneven-age forest structure with a few older trees greater than 75 years, and some natural longleaf pine regeneration. Very few stems of hardwoods are seen in the stand.

DISTURBANCE HISTORY: A road and fire breaks dissect a portion of this stand, some timber removal.

SIGNIFICANCE: This longleaf pine forest is one of the few on the Vernon District with many age-classes of longleaf pine trees intermixed throughout the forest.

OVERALL NATURAL COMMUNITY QUALITY: A/AB

JUSTIFICATION: This occurrence has many features that enhance its ecological value including good representation of different age classes, high fire frequency, a few large older trees housing Red-cockaded Woodpeckers, included hillside bogs, and diverse ground cover.

VEGETATION:
TRANSECT SAMPLE DATA

OVERSTORY/MIDSTORY DBH CLASS DISTRIBUTION*
(inches)

SPECIES	2-5	>5-10	>10-15	>15-20	>20-25	>25-30	>30-35	>35
Pinus palustris	6	5	10	5	1			

*number of stems given in each dbh class.

PERCENT WOODY COVER BY PLOT*

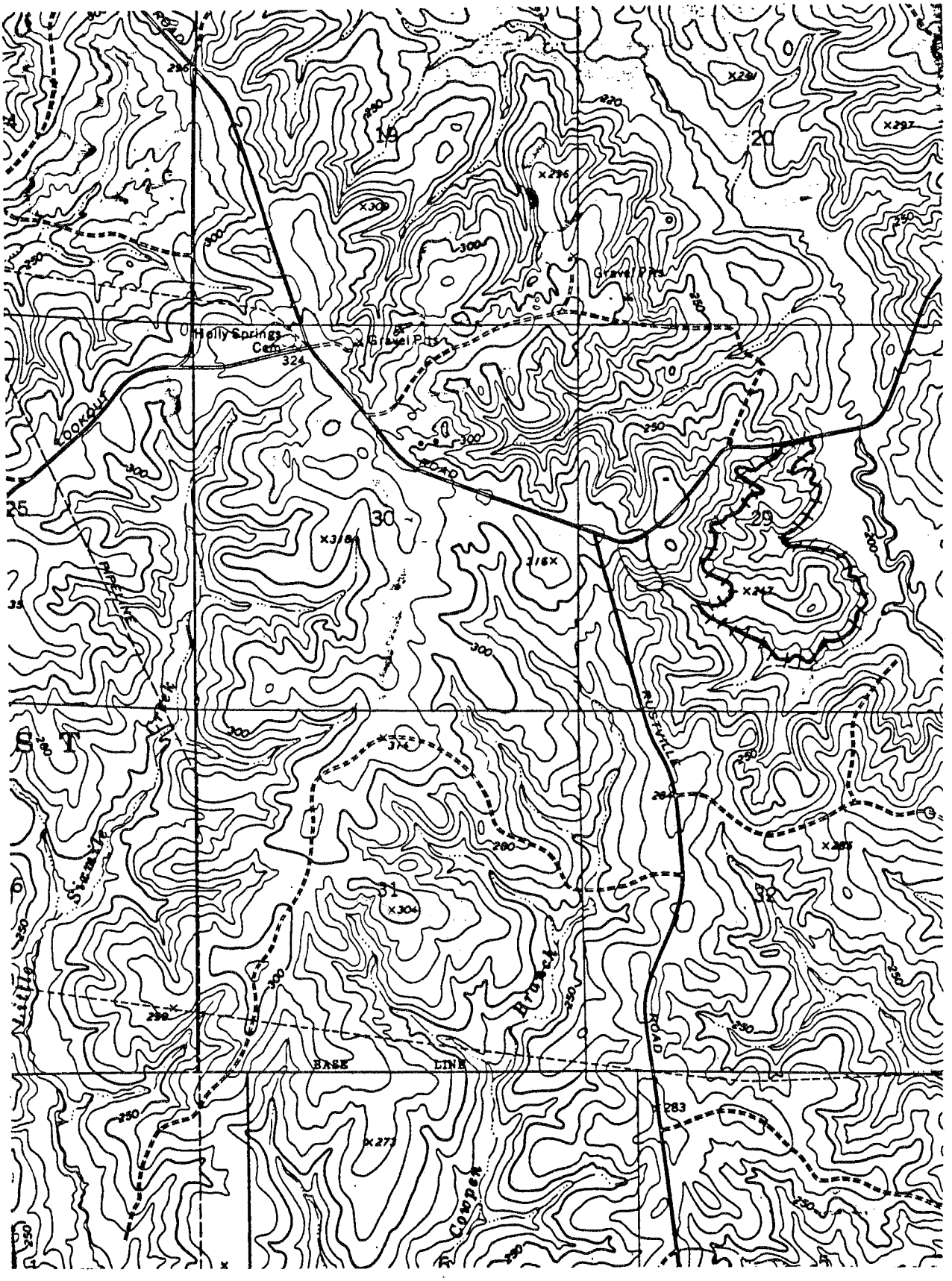
SPECIES (woody)	PLOT 1	PLOT 2	PLOT 3	PLOT 4	PLOT 5
Rubus sp.	<5	<5		<5	<5
Gelsemium sempervirens	<5				
Ilex vomitoria	<5				
Vaccinium arboreum	<5		<5	<5	<5
Vaccinium sp.	<5				
Rhus copallina			<5		
Quercus falcata		<5	<5	<5	<5
Liquidambar styraciflua		<5		5-10	
Smilax bona-nox		<5		<5	<5
Myrica cerifera			<5		<5
Rhus toxicodendron		<5	<5		

*includes all woody plants and vines < 2 inches in dbh. Cover classes include <5%, 5-10%, 10-25%, 25-50%, 50-75%, and >75%.

PERCENT HERBACEOUS COVER BY PLOT*

SPECIES (herbs)	PLOT 1	PLOT 2	PLOT 3	PLOT 4	PLOT 5
Schizachyrium scoparium	50-75	10-25	25-50	25-50	25-50
Schizachyrium tenerum	10-25			<5	<5
Panicum spp.	<5				
Andropogon gerardii	<5	<5	<5		
Helianthus angustifolius	5-10		25-50		5-10
Hedyotis nigricans		50-75		50-75	
Gymnopogon ambiguus		<5			
Paspalum sp.		<5			
Tephrosia virginiana				<5	<5
Tephrosia onobrychoides			<5		<5
Pteridium aquilinum			5-10	<5	

*cover classes include <5%, 5-10%, 10-25%, 25-50%, 50-75%, and >75%.


Holly Springs Cem.
Gravel Pit
Gravel Pits
LOOKOUT
ROAD
PIPELINE
BASE LINE
RUSSELLVILLE
ROAD
Stamps
Little
Brush
Cooper
16
20
25
30
29
32
31
T

SITE NAME: Drake's Creek Longleaf

LNHP TYPE: Upland Longleaf Pine Forest, West Gulf Coastal Plain
USFS TYPE: Longleaf Pine, Immature Sawtimber (21-12)

QUAD: Fort Polk, LA
COMPARTMENT: 10
STAND: 61
TRS: T1S, R8W, SECT 1
DISTANCE AND DIRECTION OF NEAREST TOWN: Cravens is 10 miles southeast

GENERAL DESCRIPTION: This dry upland forest is populated exclusively by longleaf pine in the canopy. The stand has a fairly open midstory with few hardwoods except scattered dogwood and young longleaf pines in small clusters within the stand. The woody understory is made up mostly of young longleaf pine, small dogwoods, red maple and winged sumac. A very diverse ground cover is present, dominated by little bluestem, slender bluestem, bracken fern, legumes, and silk-grass.

APPEARANCE: Open longleaf pine forest with grass dominated herbaceous layer and tall pines, with a very open midstory.

USFS STAND AGE: 1944, 51 years

ACREAGE OF OCCURRENCE: Approximately 70 acres

SETTING (TOPOGRAPHY, GEOLOGY, SOILS): This forest is located in gently rolling hills of the High Pleistocene Terraces that are dissected by small creeks and tributaries. The dominant soil types are Boykin, a loamy fine sand, and Ruston, a fine sandy loam, both well-drained soils. The elevation of this site is 270-300 feet.

FIRE HISTORY: Frequent burning (seems once every 3-5 years). It appears the most recent burn was about 1991 or 1992.

OLD-GROWTH CHARACTERISTICS: There are a few scattered standing dead trees within this site and much large woody debris. The forest has somewhat uneven-age stand structure with some (but not many) very old longleaf pine trees. Little natural regeneration of longleaf pine present.

DISTURBANCE HISTORY: There is some evidence of old roads and fire breaks and past timber removal (many stumps evident).

SIGNIFICANCE: This stand is a good example of a frequently burned longleaf pine forest with high species diversity in the herbaceous layer.

OVERALL NATURAL COMMUNITY QUALITY: AB/B

JUSTIFICATION: Qualities that enhance the ecological value of this forest include uneven-age stand structure, diverse ground cover, and high fire frequency. Negative features of this stand include haul roads bisecting the forest, some encroaching shrub growth, and weeds found in areas of ground disturbance.

VEGETATION:
TRANSECT SAMPLE DATA

OVERSTORY/MIDSTORY DBH CLASS DISTRIBUTION*
(inches)

SPECIES	2-5	>5-10	>10-15	>15-20	>20-25	>25-30	>30-35	>35
Pinus palustris	5	3	6	5	1			

*number of stems given in each dbh class.

PERCENT WOODY COVER BY PLOT*

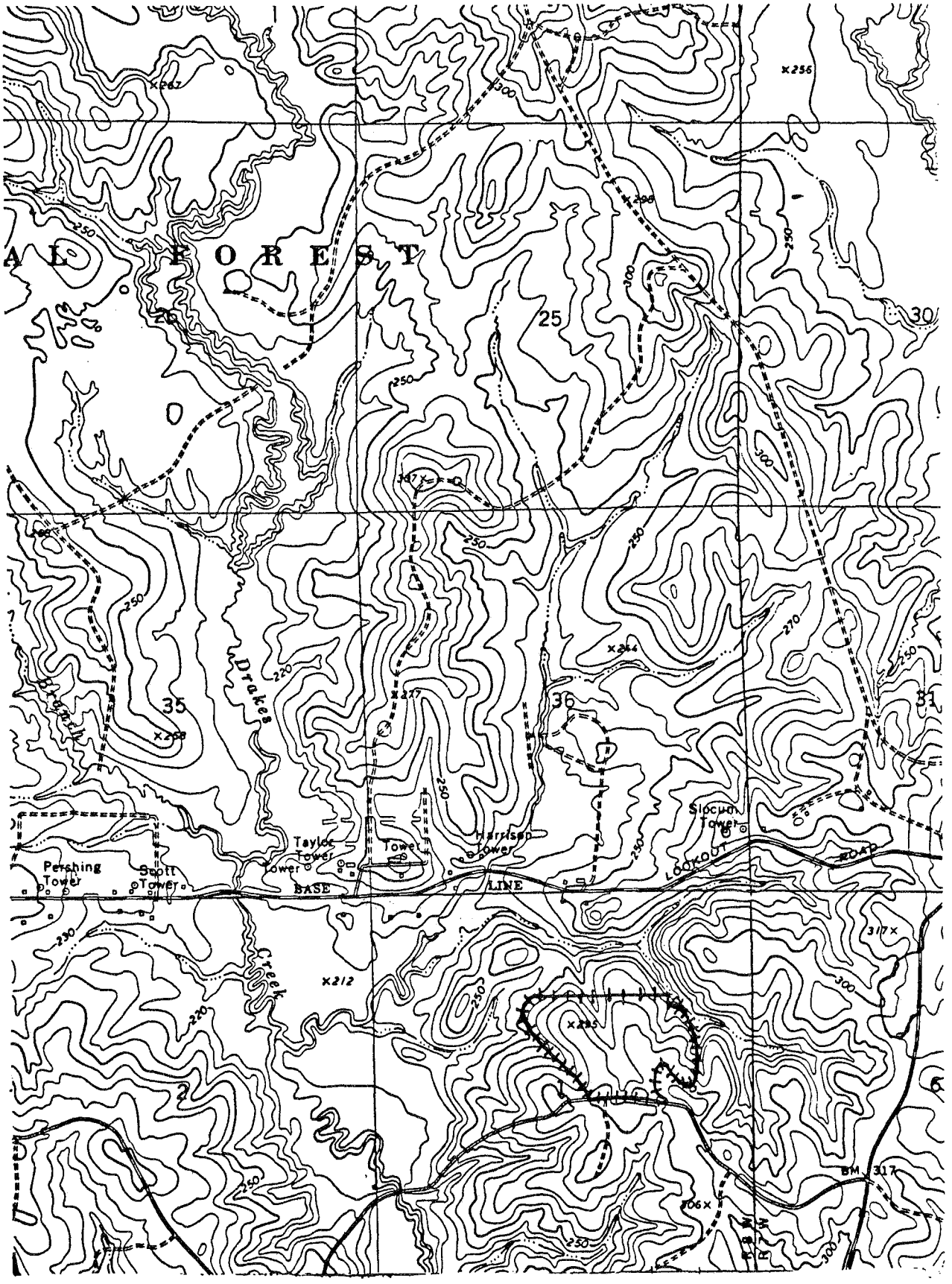
SPECIES (woody)	PLOT 1	PLOT 2	PLOT 3	PLOT 4	PLOT 5
Pinus palustris	<5	<5	10-25	5-10	<5
Smilax bona-nox	<5	<5	<5		
Magnolia virginiana	<5			<5	
Acer rubrum	<5				
Cornus florida		<5			<5
Rhus copallina			<5	<5	<5
Rubus sp.		<5	<5	<5	<5
Vaccinium arboreum					<5
Rhus toxicodendron	10-25	<5	<5	<5	

*includes all woody plants and vines < 2 inches in dbh. Cover classes include <5%, 5-10%, 10-25%, 25-50%, 50-75%, and >75%.

PERCENT HERBACEOUS COVER BY PLOT*

SPECIES (herbs)	PLOT 1	PLOT 2	PLOT 3	PLOT 4	PLOT 5
Schizachyrium scoparium	10-25	10-25	10-25	25-50	25-50
Pteridium aquilinum	50-75	<5	<5	<5	<5
Tephrosia virginiana	<5	5-10		<5	
Pityopsis graminifolia	5-10	5-10	<5	<5	5-10
Schizachyrium tenerum	<5	<5	25-50	<5	5-10
Tephrosia onobrychoides			<5		
Andropogon gerardii					<5

*cover classes include <5%, 5-10%, 10-25%, 25-50%, 50-75%, and >75%.


AL FOREST
25
30
35
36
31
Drakes Creek
Pershing Tower
Scott Tower
Taylor Tower
Tower
Harrison Tower
Slocum Tower
BASE LINE
LOOKOUT ROAD
BM 317
x212
x256
x264
x268
317x
306x

SITE NAME: Drake's Creek Uplands

LNHP TYPE: Upland Longleaf Pine Forest, West Gulf Coastal Plain
USFS TYPE: Longleaf Pine, Immature Sawtimber (21-12)

QUAD: Fort Polk, LA
COMPARTMENT: 10
STAND: 33
TRS: T1S, R7W, SECT 6
DISTANCE AND DIRECTION OF NEAREST TOWN: Sugrue is 4 miles southeast

GENERAL DESCRIPTION: The canopy is dominated by tall longleaf pines. There is a fairly open midstory except for scattered dogwood and wax myrtles. The understory is composed of scattered huckleberries, wax myrtles, and juvenile longleaf pines. The ground cover is dominated by little bluestem, panic grasses, other grasses, poison oak and legumes.

APPEARANCE: This forest is open with tall longleaf pines, little to no midstory, and a grass-dominated herbaceous layer.

USFS STAND AGE: 1926, 69 years

ACREAGE OF OCCURRENCE: Approximately 15 acres

SETTING (TOPOGRAPHY, GEOLOGY, SOILS): This occurrence is located in gently rolling terrain of the High Pleistocene Terraces. It is found at 290-300 feet elevation. The soil type is Ruston, a well-drained fine sandy loam.

FIRE HISTORY: Very high frequency of fire, burned once every one to three years. It appears the most recent burn was about 1992.

OLD-GROWTH CHARACTERISTICS: This site exhibits some characteristics of old-growth including many rotting logs and large woody debris and an uneven-age distribution of trees. There are not many standing dead trees or many very large older longleaf pines at this site; very little natural regeneration of longleaf pine is evident.

DISTURBANCE HISTORY: Old and new roads present. Some thinning in recent past (stumps visible).

SIGNIFICANCE: An example of frequently burned longleaf pine forest with a diverse ground cover.

OVERALL NATURAL COMMUNITY QUALITY: A/AB

JUSTIFICATION: Qualities that enhance the ecological value of this stand include uneven-age forest structure, high herbaceous richness, high fire frequency, and some older trees. However, some ground disturbance has promoted the encroachment of exotics and weeds into the area.

VEGETATION:
TRANSECT SAMPLE DATA

OVERSTORY/MIDSTORY DBH CLASS DISTRIBUTION*
(inches)

SPECIES	2-5	>5-10	>10-15	>15-20	>20-25	>25-30	>30-35	>35
Pinus palustris			4	4				

*number of stems given in each dbh class.

PERCENT WOODY COVER BY PLOT*

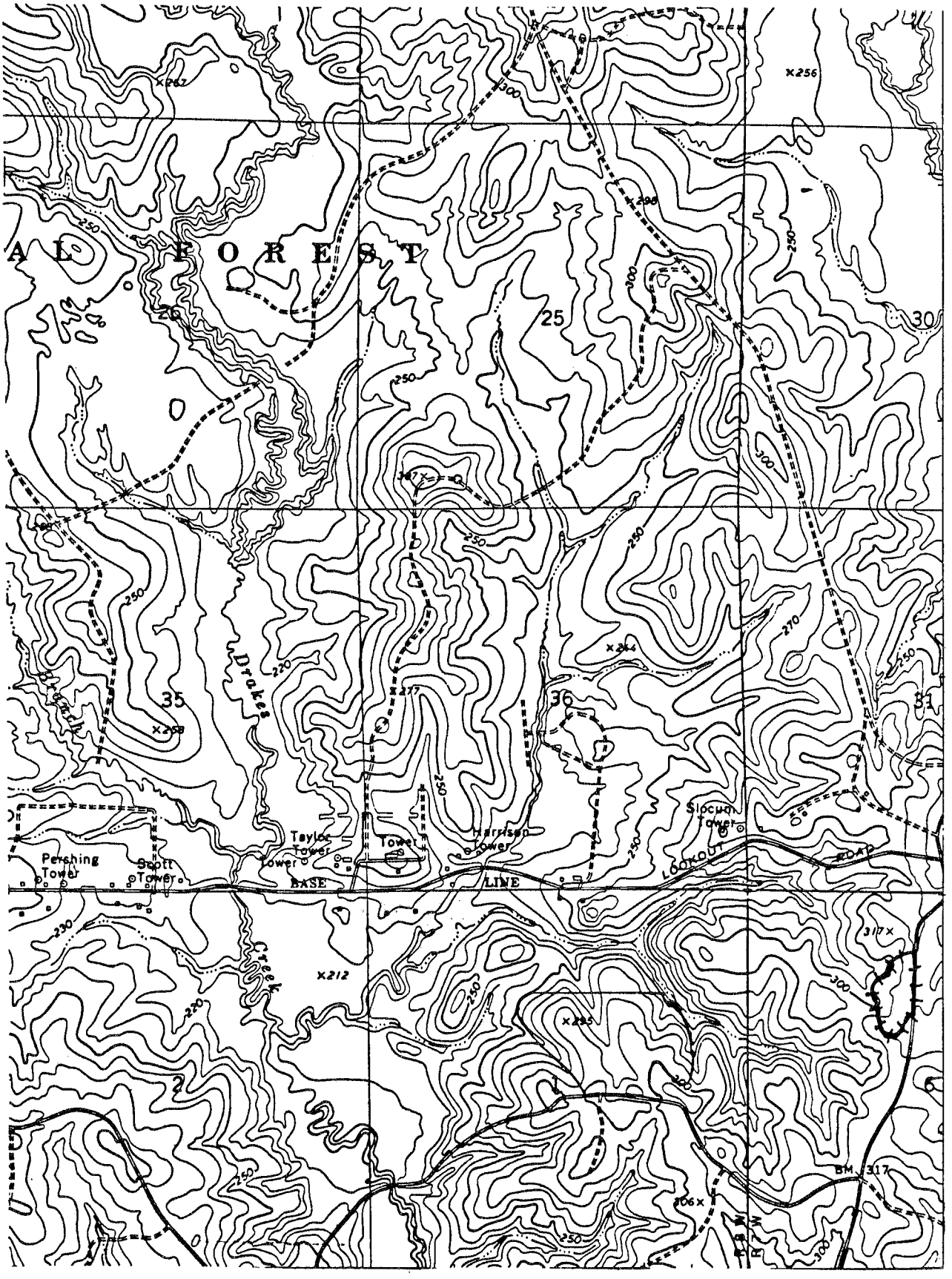
SPECIES (woody)	PLOT 1	PLOT 2	PLOT 3	PLOT 4	PLOT 5
Vaccinium elliottii	<5	<5	<5	<5	<5
Vaccinium arboreum	<5	<5	<5	<5	<5
Pinus palustris	<5	<5	5-10	<5	<5
Myrica cerifera	<5	<5	<5	<5	<5
Rhus toxicodendron	<5	<5	<5	5-10	<5

*includes all woody plants and vines < 2 inches in dbh. Cover classes include <5%, 5-10%, 10-25%, 25-50%, 50-75%, and >75%.

PERCENT HERBACEOUS COVER BY PLOT*

SPECIES (herbs)	PLOT 1	PLOT 2	PLOT 3	PLOT 4	PLOT 5
Schizachyrium scoparium	>75	>75	50-75	50-75	>75
Tephrosia virginiana	<5	<5	<5	<5	<5
Schizachyrium tenerum	<5		<5		<5
Dichanthelium aciculare	<5	<5	<5	<5	<5
Panicum spp.		<5		<5	
Andropogon gerardii	<5	5-10	<5	<5	<5

*cover classes include <5%, 5-10%, 10-25%, 25-50%, 50-75%, and >75%.


AL FOREST
Drakes
Creek
Pershing Tower
Scott Tower
Taylor Tower
Tower
Harrison Tower
Slocum Tower
LOOKOUT
ROAD
BASE LINE
BM 317
x212
x256
x295
317
306
25
30
35
31

SITE NAME: Holly Branch Longleaf

LNHP TYPE: Upland Longleaf Pine Forest, West Gulf Coastal Plain
USFS TYPE: Longleaf Pine, Immature Sawtimber (21-12)

QUAD: Sugrue, LA
COMPARTMENT: 24
STAND: 45
TRS: T1S, R6W, SECT 8
DISTANCE AND DIRECTION OF NEAREST TOWN: Fullerton is approximately 2 miles northwest

GENERAL DESCRIPTION: This forest is characterized by a longleaf pine dominated canopy with few hardwood trees in the midstory. The woody understory contains waxmyrtle, huckleberries, sassafras, sweetgum, sumac and juvenile longleaf pines. The ground cover is dominated by grasses such as slender bluestem, little bluestem, panic grasses, and legumes.

APPEARANCE: An open longleaf pine dominated forest with a rich grass-dominated herbaceous layer.

USFS STAND AGE: 1933, 62 years

ACREAGE OF OCCURRENCE: 40 acres

SETTING (TOPOGRAPHY, GEOLOGY, SOILS): This forest is located on a side slope of a broad flat ridge above Holly Branch. The topography is gently rolling hills of the High Pleistocene Terraces. Elevation here ranges from 230 to 260 feet. The soil of this area is predominately Malbis, a well-drained fine sandy loam that formed in loamy sediments of Pleistocene-age streams.

FIRE HISTORY: Fairly frequently burned stand, burned once every three to five years. It appears the site last burned about 1991 or 1992.

OLD-GROWTH CHARACTERISTICS: There are many standing dead trees throughout this forest. The canopy contains many gaps near older longleaf pine trees and some regeneration of young longleaf pines below the canopy gaps. There are many rotting logs on the forest floor and many large flat-topped longleaf pine trees within the stand.

DISTURBANCE HISTORY: There are many old haul roads throughout this area. Many stumps are visible within the stand. Fire breaks are also evident.

SIGNIFICANCE: This forest has many old growth characteristics. This area represents one of few longleaf pine forests that are frequently burned with little hardwood growth in the midstory.

OVERALL NATURAL COMMUNITY QUALITY: AB/B

JUSTIFICATION: Features that make this occurrence ecologically significant include old-growth characteristics, little hardwood growth in the midstory, diverse ground cover, and some juvenile longleaf pine regeneration. Features that detract from this forest include the disturbance from haul roads and old fire breaks.

VEGETATION:

TRANSECT SAMPLE DATA

OVERSTORY/MIDSTORY DBH CLASS DISTRIBUTION*
(inches)

SPECIES	2-5	>5-10	>10-15	>15-20	>20-25	>25-30	>30-35	>35
Pinus palustris	1	1	3	5	1			

* number of stems given in each dbh class.

PERCENT WOODY COVER BY PLOT*

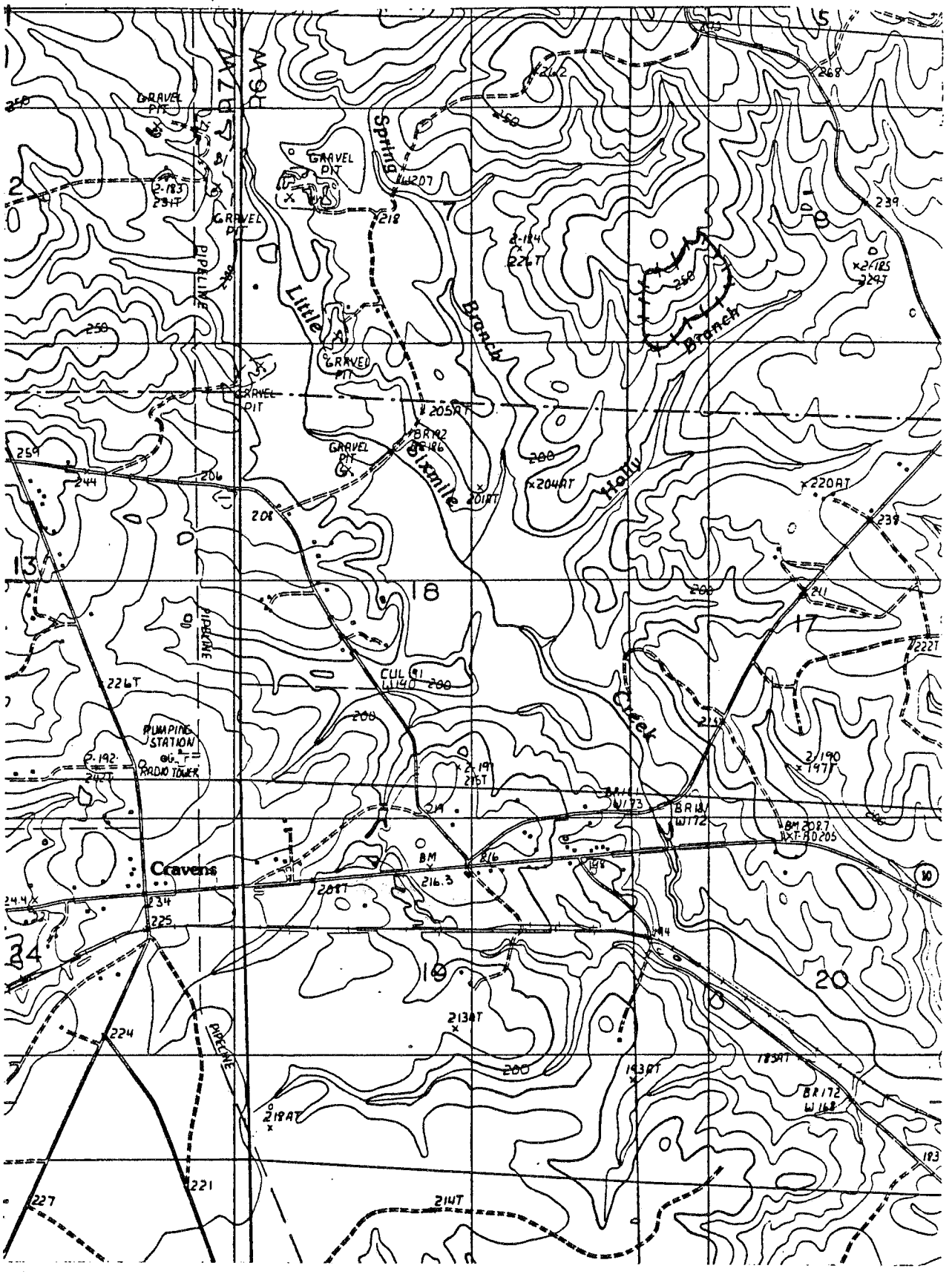
SPECIES (woody)	PLOT 1	PLOT 2	PLOT 3	PLOT 4	PLOT 5
Rubus sp.	10-25	5-10	10-25	5-10	25-50
Vaccinium arboreum	<5	<5	<5	<5	<5
Myrica cerifera	<5	5-10	5-10	<5	10-25
Vaccinium sp.	<5	<5	<5		
Berchemia scandens		<5			
Sassafras albidum	<5		<5		
Pinus palustris				<5	
Rhus copallina					<5
Liquidambar styraciflua				<5	<5

*includes all woody plants and vines < 2 inches in dbh. Cover classes include <5%, 5-10%, 10-25%, 25-50%, 50-75%, and >75% .

PERCENT HERBACEOUS COVER BY PLOT*

SPECIES (herbs)	PLOT 1	PLOT 2	PLOT 3	PLOT 4	PLOT 5
Schizachyrium scoparium	10-25	10-25	10-25	10-25	5-10
Schizachyrium tenerum	25-50	50-75	5-10	50-75	10-25
Dichanthelium aciculare	<5	<5	<5		<5
Panicum spp.	<5	<5		<5	
Dichanthelium oligosanthes	<5			<5	
Gymnopogon ambiguus		<5			
Eupatorium compositifolium					<5
Eupatorium rotundifolium					<5
Muhlenbergia expansa			<5		
Tephrosia virginiana			5-10	5-10	

*cover classes include <5%, 5-10%, 10-25%, 25-50%, 50-75%, and >75%.


GRAVEL PIT
PIPELINE
Spring
GRAVEL PIT
Little
Branch
GRAVEL PIT
GRAVEL PIT
BRN2 BR186
Bixmile
Hollow
Branch
PIPELINE
CUL 91 W140
Creek
PUMPING STATION
RADIO TOWER
Cravens
BM 216.3
BR181 W173
BR181 W172
BM 208.7
BR172 W168
PIPELINE
BR172 W168
183
214T
227
221
224
234
225
244
259
206
208
200
204AT
205AT
201AT
220AT
213AT
218AT
193AT
183AT
226T
222T
239
241
268
242
218
207
184
226T
185
229T
197T
190
216T
215T
213
214
216
219
18
17
13
10
20
8
7
5
2
1

SITE NAME: West Fork Longleaf

LNHP TYPE: Upland Longleaf Pine Forest, West Gulf Coastal Plain
USFS TYPE: Longleaf Pine, Immature Sawtimber (21-12)

QUAD: Birds Creek, LA
COMPARTMENT: 26
STAND: 38
TRS: T1S, R6W, SECT 5
DISTANCE AND DIRECTION OF NEAREST TOWN: Cravens is approximately 2.8 miles south

GENERAL DESCRIPTION: This forest is dominated by longleaf pine. Some small blackjack oak, southern red oak, sassafras, huckleberries, sumac and juvenile longleaf pines can be found in the woody understory. The ground cover is quite diverse and dominated by little bluestem, slender bluestem, panic grasses, muhly grass and legumes.

APPEARANCE: An open forest with a diverse grass-dominated herbaceous layer.

USFS STAND AGE: 1945, 50 years

ACREAGE OF OCCURRENCE: 60 acres

SETTING (TOPOGRAPHY, GEOLOGY, SOILS): This forest is located on a ridgetop above small tributaries of West Fork Sixmile Creek. The topography is gently rolling hills of the High Pleistocene Terraces. The elevation ranges from 250 to 270 feet. The soil is Malbis, a well-drained fine sandy loam that formed in loamy sediments of Pleistocene-age streams.

FIRE HISTORY: A fairly frequently burned area (once every three to five years). It appears the most recent burn was in 1994.

OLD-GROWTH CHARACTERISTICS: There are a few scattered standing dead trees, canopy gaps near older longleaf pine trees, some rotting logs, many older damaged, flat-topped longleaf pine trees, an uneven-age distribution of trees and small patches of juvenile longleaf pine trees.

DISTURBANCE HISTORY: There is evidence of previous haul roads within this area. There is an old railroad grade that runs north to south on the eastern edge of this occurrence.

SIGNIFICANCE: This is an uneven-aged forest with some old-growth characteristics, and a rich ground cover.

OVERALL NATURAL COMMUNITY QUALITY: AB/B

uneven-age forest structure, old-growth characteristics, low amount of hardwoods in the midstory, high species diversity in the ground cover. The negative aspects of this forest include some weed growth in disturbed areas, low juvenile longleaf pine regeneration.

VEGETATION:

TRANSECT SAMPLE DATA

OVERSTORY/MIDSTORY DBH CLASS DISTRIBUTION*
(inches)

SPECIES	2-5	>5-10	>10-15	>15-20	>20-25	>25-30	>30-35	>35
Pinus palustris	3	4	6	9				

* number of stems given in each dbh class.

PERCENT WOODY COVER BY PLOT*

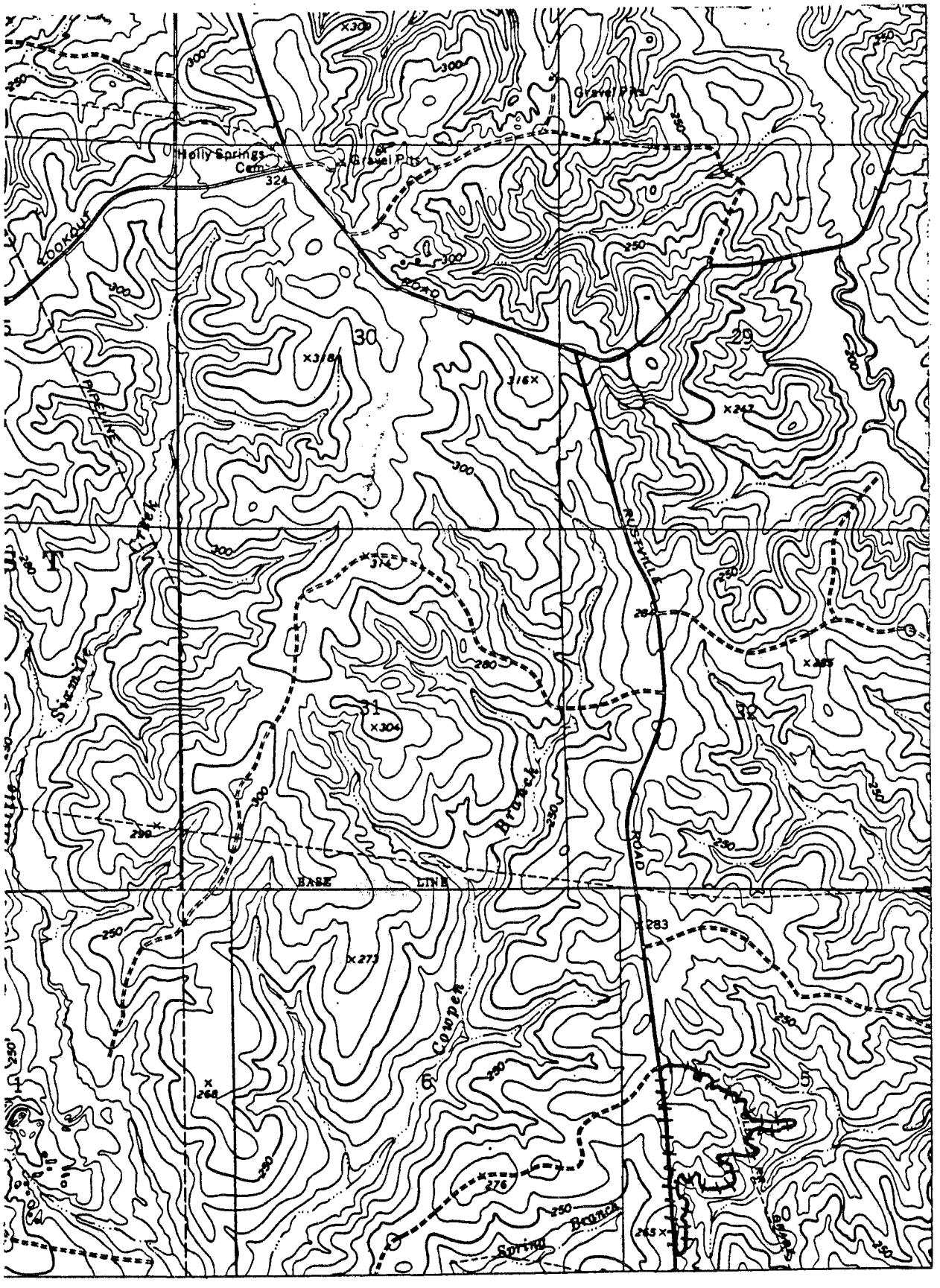
SPECIES (woody)	PLOT 1	PLOT 2	PLOT 3	PLOT 4	PLOT 5
Rubus sp.	<5	<5	<5	<5	<5
Vaccinium sp.	<5	<5			
Myrica cerifera	<5	<5			
Quercus marilandica	<5		<5		
Smilax bona-nox	<5	<5	<5		
Rhus copallina		<5	<5		
Vaccinium arboreum			<5		
Pinus palustris				<5	<5
Gelsemium sempervirens				<5	
Quercus falcata				<5	<5
Vitis rotundifola					<5
Sassafras albidum				<5	
Asimina parviflora					<5

*includes all woody plants and vines < 2 inches in dbh. Cover classes include <5%, 5-10%, 10-25%, 25-50%, 50-75%, and >75% .

PERCENT HERBACEOUS COVER BY PLOT*

SPECIES (herbs)	PLOT 1	PLOT 2	PLOT 3	PLOT 4	PLOT 5
Schizachyrium scoparium	75-100	75-100	75-100	50-75	50-75
Schizachyrium tenerum	5-10	5-10	<5	<5	<5
Panicum spp.	<5	<5			
Tephrosia virginiana	<5	<5	5-10	5-10	5-10
Muhlenbergia expansa	<5			<5	
Dichanthelium aciculare		<5		<5	<5
Gymnopogon ambiguus			<5		<5
Eupatorium capillifolium			<5		

*cover classes include <5%, 5-10%, 10-25%, 25-50%, 50-75%, and >75% .


Holly Springs
Cem.
Gravel Pits
Gravel Pits
324
Cookout
30
29
31
32
T
Pinetown
Creek
Swamp
Creek
RUSSELLS
ROAD
Branch
BASE
LINE
Cooper
Spring
Branch
Branch
316
314
304
283
276
265

SITE NAME: Coon Branch Uplands

LNHP TYPE: Upland Longleaf Pine Forest, West Gulf Coastal Plain
USFS TYPE: Longleaf Pine, Immature Sawtimber (21-12)

QUAD: Sugrue, LA
COMPARTMENT: 16
STAND: 17
TRS: T1S, R7W, SECT 9
DISTANCE AND DIRECTION OF NEAREST TOWN: Sugrue is approximately 3.5 miles southeast

GENERAL DESCRIPTION: This is a longleaf pine dominated forest with many young longleaf pines making up the midstory component. Woody understory species include tree huckleberry, sweetgum, sumac and dogwood. The diverse ground cover is dominated by little bluestem, slender bluestem, panic grasses, silk-grass and legumes.

APPEARANCE: This forest has an open aspect to it with little hardwood growth in the midstory. Clusters of young longleaf pine trees can be seen throughout the area. A grass dominated herbaceous later is characteristic of this area.

USFS STAND AGE: 1933, 62 years

ACREAGE OF OCCURRENCE: Approximately 25 acres

SETTING (TOPOGRAPHY, GEOLOGY, SOILS): This occurrence is located along an upper slope above Coon Branch. The topography is gently rolling hills of the High Pleistocene Terraces. Elevation ranges from 250 to 280 feet. The soil is predominately Malbis, a well-drained sandy loam soil that is formed from loamy sediments of Pleistocene-age streams.

FIRE HISTORY: This forest is burned fairly frequently. It appears the most recent burn occurred about 1994.

OLD-GROWTH CHARACTERISTICS: Many large standing dead trees are found in the forest. Canopy gaps are present near older pine trees. Few rotting logs are found on the forest floor. There is an uneven-age distribution of longleaf pine trees.

DISTURBANCE HISTORY: Old haul roads, fire breaks and stumps left over from timber removal are evident in this stand. The Big Branch Recreation Trail is nearby.

SIGNIFICANCE: This forest contains a good representation of older longleaf pine trees and is a good example of uneven-age forest structure.

OVERALL NATURAL COMMUNITY QUALITY: AB/B

JUSTIFICATION: Qualities that make this forest ecologically important include an uneven-age forest structure, little hardwood growth, a diverse ground cover, and older longleaf pine trees within stand. Features that detract from this forest include some shrub and weed growth in areas of higher disturbance due to old haul roads and areas of fire suppression within the forest.

VEGETATION:

TRANSECT SAMPLE DATA

OVERSTORY/MIDSTORY DBH CLASS DISTRIBUTION*
(inches)

SPECIES	2-5	>5-10	>10-15	>15-20	>20-25	>25-30	>30-35	>35
Pinus palustris			8	3	2			

* number of stems given in each dbh class.

PERCENT WOODY COVER BY PLOT*

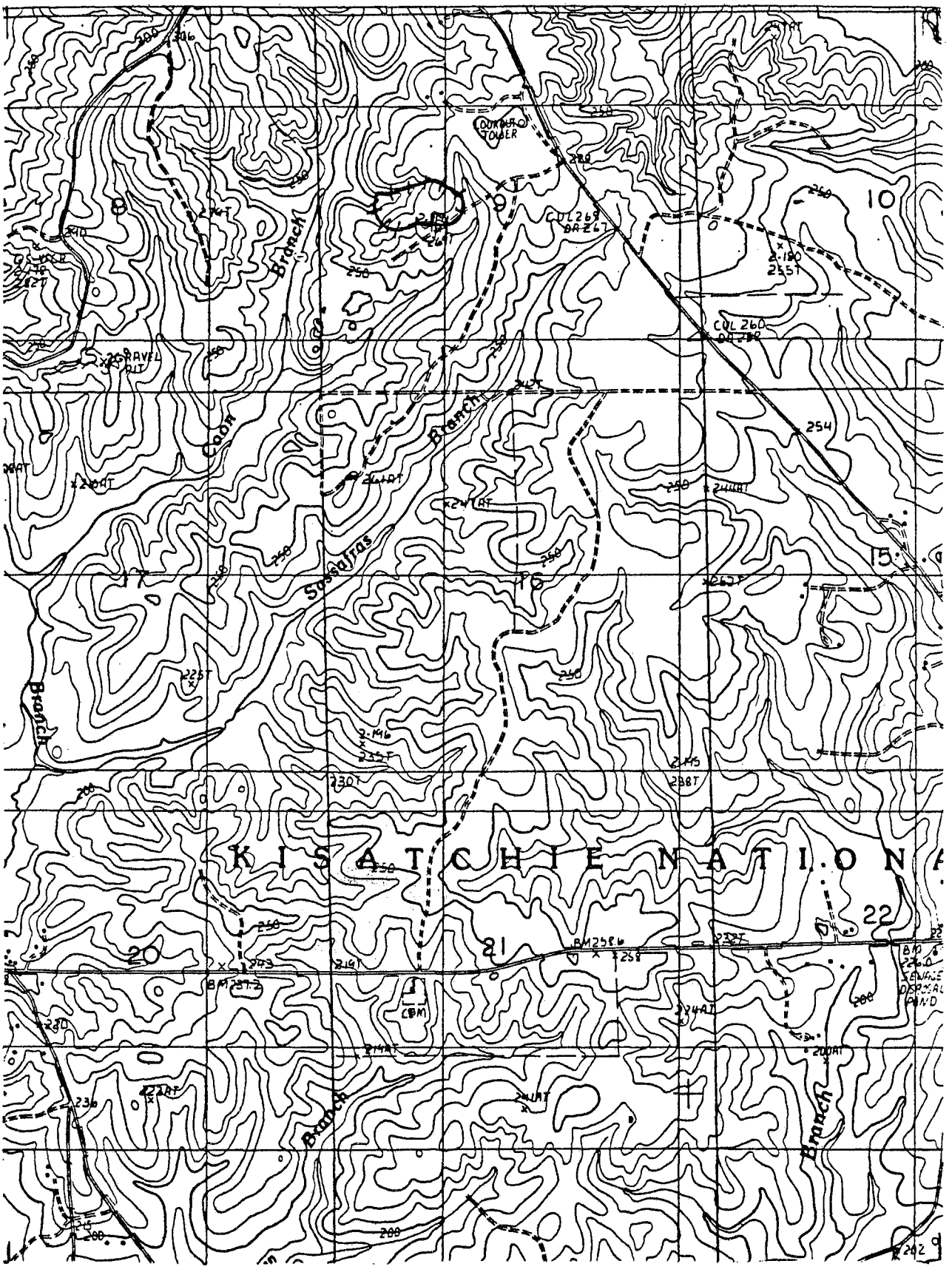
SPECIES (woody)	PLOT 1	PLOT 2	PLOT 3	PLOT 4	PLOT 5
Pinus palustris	5-10	5-10	5-10	5-10	<5
Vaccinium arboreum	<5	10-25	<5		
Liquidambar styraciflua	<5	<5	<5	<5	<5
Rubus sp.	<5	<5	<5		<5
Smilax bona-nox	<5	5-10	5-10	5-10	<5
Rhus copallina				<5	
Cornus florida					<5
Vitis rotundifolia				5-10	

*includes all woody plants and vines < 2 inches in dbh. Cover classes include <5%, 5-10%, 10-25%, 25-50%, 50-75%, and >75% .

PERCENT HERBACEOUS COVER BY PLOT*

SPECIES (herbs)	PLOT 1	PLOT 2	PLOT 3	PLOT 4	PLOT 5
Schizachyrium scoparium	50-75	50-75	50-75	50-75	75-100
Schizachyrium tenerum	10-25	5-10	10-25	10-25	<5
Tephrosia virginiana	<5	<5	5-10	5-10	<5
Hedyotis nigricans	<5	5-10		<5	<5
Dichanthelium aciculare	<5				
Pityopsis graminifolia		<5	<5		
Panicum spp.			<5	<5	<5

*cover classes include <5%, 5-10%, 10-25%, 25-50%, 50-75%, and >75% .


COURSEY TOWER
CUL 269 DR 267
CUL 260 DR 258
Sassafras Branch
Branch
Branch
Branch
Branch
KISATCHIE NATIONA
BM 286
BM 282
8
9
10
15
16
17
20
21
22

SUMMARY

This natural community inventory of the Vernon District of Kisatchie National Forest has provided a detailed overview of the current condition of this district's natural communities. The field survey, along with an analysis of presettlement natural community distributions and characteristics, has allowed an in-depth description of this district from an ecological perspective. This report should promote implementation of ecosystem management by providing an understanding of the composition, structure, function, distribution, and interrelationships among the natural plant communities indigenous to this district. In addition, the inventory has facilitated identification of many of the best remaining natural plant communities on the Vernon District.

There remain many high-quality occurrences of the various natural communities indigenous to the district, and these relatively intact areas act as refugia for many species that have been greatly reduced or eliminated by habitat loss from surrounding intensively-managed lands. However, extensive habitat alterations have occurred on the district. The most dramatic changes in plant community structure and species composition from presettlement conditions have occurred in the uplands. Among these is the planting and invasion of loblolly pine, slash pine, sweetgum, and other historically fire-restricted species into former longleaf pine areas following initial clearcutting earlier in this century and subsequent fire suppression. The consequent shading and competition from this encroachment have lowered apparent plant species diversity in the ground cover and precluded longleaf pine regeneration in many areas. In addition, even-aged, short-rotation pine management have dramatically altered natural forest conditions in many areas. Relatively short, even-aged rotations (of 60 to 80 to 120 years) prevent forests from reaching their natural, uneven-age condition, interrupt natural regeneration and preclude consequent heterogeneous stand structure, and could significantly reduce overall native biodiversity over the long-term.

Old-growth forests that remain on KNF, particularly those few that remain on the uplands, are critically important natural areas. Old-growth longleaf pine forests that approximate presettlement stand structure and age-class distribution are extremely rare and

invariably occur as small patches, usually embedded within stands assigned relatively young ages (60 to 80 years). All remnant old-growth forests of all types should be carefully studied, so that we may better understand the structure, composition, and dynamics of the natural communities of KNF.

Although most of the high-quality forest community occurrences on the Vernon District are believed to have been examined in this survey, all of the old-growth forests may not have been found. Time constraints did not permit survey of many older mixed hardwood-loblolly and riparian forests and many occurrences of small-scale communities were undoubtedly missed.

In the course of this survey, apparent inconsistencies were found in stand age estimates given in USFS documents and the actual age-class(es) in the stand, particularly in hardwood-dominated forests. It was common to find areas of trees older than the age estimate given for the stand. In general, the aging of many stands appears superficial.

The stands currently designated within each compartment are often unnatural mosaics having little connection to natural community distributions. Large areas of formerly longleaf-dominated upland have been subdivided into artificial units of varying forest management types. For example, often ridgetops or sandier soils such as Briley have been assigned to longleaf pine, while slopes on sandy loams (such as Malbis) which formerly supported longleaf pine, have become loblolly or slash pine plantations. It is hoped that the elucidation of presettlement vegetation patterns and processes will be a primary guide in the future assignment of stand types appropriate to ecosystem management.

In conclusion, we believe that this natural community survey will be of great benefit in 1) elucidating the original character and distribution of the natural plant communities; 2) understanding how these communities have been altered by anthropogenic forces; 3) identifying many of the best remaining examples of the natural communities; and 4) furthering conservation of the full range of natural communities and associated species indigenous to the district. The conservation, protection, and restoration of native biological diversity through ecosystem management is a goal of the USFS. Therefore, judicious management of all native plant communities, within which practically the total spectrum of indigenous terrestrial life is found, is an essential basis for achieving this goal.

LITERATURE CITED

Autin, W.J., S.F. Burns, B.J. Miller, R.T. Suacier and J.I. Snead. 1991. Quaternary geology of the Lower Mississippi Valley. Pages 547-582 *in* R.B. Morrison, ed. Quaternary Nonglacial Geology: Conterminous U.S., The Geology of North America, Vol. K-2. The Geol. Soc. of America. Boulder, CO.

Bartram, W. 1791(1958). Travels. Francis Harper, editor. Yale Univ. Press, New Haven, CT.

Boyer, W.D. 1991. *Pinus palustris* Mill., Longleaf pine. Pages 405-412 *in* Silvics of North America I. Conifers. USDA Agric. Handbook 654, Washington, D.C.

Bradford, J.L. 1880. Survey notes, Northwest District, Louisiana Meridian. T1&2N, R5&6W. General Land Office, Washington, D.C. [State Land Office, Baton Rouge, LA.]

Bradford, J.L. 1882. Survey notes, Northwest District, Louisiana Meridian. T1N, R7&8W. General Land Office, Washington, D.C. [State Land Office, Baton Rouge, LA.]

Bradford, J.L. and J. Kap. 1877a. Survey notes, Northwest District, Louisiana Meridian. T1N, R2W - baseline and guide meridian. General Land Office, Washington, D.C. [State Land Office, Baton Rouge, LA.]

Bradford, J.L. and J. Kap. 1877b. Survey notes, Southwest District, Louisiana Meridian. T1,2,3&4S, R5W. General Land Office, Washington, D.C. [State Land Office, Baton Rouge, LA.]

Bradford, J.L. and J. Kap. 1878. Survey notes, Southwest District, Louisiana Meridian. T1S, R7,8&9W. General Land Office, Washington, D.C. [State Land Office, Baton Rouge, LA.]

Bridges, E.L. and S.L. Orzell. 1989. Longleaf pine communities of the West Gulf Coastal Plain. Natural Areas Journal 9:246-262.

Burns, Anna C. 1968. A History of the Louisiana Forestry Commission. Louisiana Studies Institute, Northwestern State College, Natchitoches, Louisiana.

Chapman, Herman Haupt. 1909. A method of studying growth and yield of longleaf pine applied in Tyler Co., Texas. Soc. Am. For Proc. 4:207-220.

Chapman, Herman Haupt. 1932a. Is the longleaf type a climax? Ecology 13:328-334.

Chapman, Herman Haupt. 1932b. Some further relations of fire to longleaf pine. J. For. 30:602-604.

Christensen, N.L. 1981. Fire regimes in southeastern ecosystems. Pages 112-136 *in* H. a. Mooney, T.M. Bonnicksen, N.L. Christensen, J.E. Lotan, and W.A. Reiners, editors. Fire regimes and ecosystem properties. USDA Forest Serv. Gen. Tech. Rep. WO-26.

Christensen, N.L. 1987. The biogeochemical consequences of fire and their effects on the vegetation of the coastal plain of the southeastern United States. Pages 1-21 *in* L. Trabaud, editor. The role of fire in ecological systems. SPB Academic Publishing.

Correl, D.S. and M.C. Johnston. 1970. Manual of the vascular plants of Texas. Texas Research Found., Renner.

Croker, T.C., Jr. 1987. Longleaf pine: A history of man and a forest. USDA Forest Serv., Southern Region. Forestry Rep. R8-FR7.

Donahue, R.L., R.W. Miller and J.C. Shickluna. 1977. Soils. An introduction to soils and plant growth. Prentice-Hall, Inc., Englewood Cliffs, N.J.

Garren, K.H. 1943. Effects of fire on vegetation of the southeastern United States. Bot. Rev. 9:617-654.

Glitzenstein, J.S., P.A. Harcombe, and D.R. Streng. 1986. Disturbance history, succession, and the maintenance of species diversity in an east Texas forest. Ecol. Monogr. 56:243-258.

Harper, R.M. 1911. The relation of climax vegetation to islands and peninsulas. Bull. Torrey Bot. Club 38:515-525.

Harper, R.M. 1927. Natural resources of southern Florida. 18th Ann. Rep. Fla. St. Geol. Survey. pp. 27-206.

Hart, B. and G. Lester. 1993. Natural communities and sensitive species assessment of Fort Polk Military Reservation, Louisiana. Louisiana Dept. Wildlife and Fisheries, Baton Rouge, LA.

Heyward, F. 1939. The relation of fire to stand composition of longleaf pine forests. Ecology 20:287-304.

Hilgard, Eugene W. 1884. Report on cotton production in the United States; agricultural and physico-geographical descriptions of the several cotton states and of California. Part 1. Mississippi Valley and Southwestern States. Government Printing Office, Washington, D.C.

Howe, George M. 1974. Tornado path sizes. J. Applied Meteor. 13:343-347.

Kartesz, J.T. 1994. A synonomized checklist of the vascular flora of the United States, Canada and Greenland, 2nd Ed. Vols. I. & II. Timber Press, Portland, Oregon.

Kelly, D.L., J.T. Schaefer, R.P. McNulty, and C.A. Doswell III. 1978. An augmented tornado climatology. Monthly Weather Rev. 106:1172-1183.

Komarek, E.V. 1965. Fire ecology -- grasslands and man. Proc. Ann. Tall Timbers Fire Ecology Conf., Tallahassee, FL. 4:169-220.

Komarek, E.V. 1968. Lightning and lightning fires as ecological forces. Proc. Ann. Tall Timbers Fire Ecology Conf., Tallahassee, FL. 8:169-197.

Lockett, Samuel Henry. 1874(1969). Louisiana as it is. Lauren C. Post, *Ed*. Louisiana State University Press, Baton Rouge.

Lorimer, C.G. 1980. Age structure and disturbance history of a southern Appalachian virgin forest. Ecology 61:1169-1184.

MacRoberts, Barbara, and Michael MacRoberts. 1988. Floristic composition of two west Louisiana pitcher plant bogs. Phytologia 65:184-190.

MacRoberts, Barbara, and Michael MacRoberts. 1991. The distribution of *Sarracenia* in Louisiana, with data on its abundance in the western part of the state. Phytologia 70:119-125.

MacRoberts, Barbara, and Michael MacRoberts. 1992. Floristics of four small bogs in western Louisiana with observations on species/area relationships. Phytologia 73:49-56.

MacRoberts, Barbara, and Michael MacRoberts. 1993. Floristics of a bog in Vernon Parish, Louisiana, with comments on noteworthy bog plants of western Louisiana. Phytologia 75:247-258.

Martin, D.L. 1992. Point frequency of tornadic winds in north Louisiana. Unpublished report, submitted to the Louisiana Natural Heritage Prog., Louisiana Dept. of Wildl. and Fish., Baton Rouge.

Martin, D.L. and L.M. Smith. 1991. A survey and description of the natural plant communities of Kisatchie National Forest, Winn and Kisatchie Districts. Louisiana Dept. of Wildl. and Fish., Baton Rouge.

Martin, D.L. and L.M. Smith. 1993. A survey and description of the natural plant communities of Kisatchie National Forest, Evangeline and Catahoula Districts. Louisiana Dept. of Wildl. and Fish., Baton Rouge.

Mohr, Charles. 1897. The timber pines of the southern United States. Government Printing Office, Washington.

Nixon, E.S. and J.R. Ward. 1986. Floristic composition and management of east Texas pitcher plant bogs. Pages 283-287 *in* D.L. Kulhavy and R.W. Conner, editors. Wilderness and natural areas in the eastern United States: A management challenge. Center for Applied Studies, School of Forestry, Stephen F. Austin State University, Nacogdoches, TX.

Olson, M.S. 1992. Effects of early and late growing season fires on resprouting of shrubs in upland longleaf pine savannas and embedded seepage savannas. M.S. Thesis, Louisiana State Univ., Baton Rouge.

Osborn, W.H. 1860. Field notes of the survey of T4N R3W. General Land Office. Washington, D.C.

Platt, William J. and S.M. Hermann, 1986. Relationships between dispersal syndrome and characteristics of populations of trees in a mixed-species forest. Pages 309-321 *in* A. Estrada, T.H. Fleming, C. Vasques-Yanes, R. Dirzo, editors. Frugivores and Seed Dispersal. Dr. W. Junk Publishers, Netherlands.

Platt, William J., Gregory W. Evans, and Stephen L. Rathbun. 1988. The population dynamics of a long-lived conifer (*Pinus palustris*). Am. Nat. 131:491-525.

Platt, William J., L. Smith, N. Gilmore, R. Baker, and D. Pashley. 1990. Proposed management for hillside seepage bogs of Kisatchie National Forest. Unpubl. document for Kisatchie National Forest, Louisiana Natural Heritage Prog., La. Dept. Wildl. Fish., Baton Rouge.

Pyne, S. 1984. Wildland fire: Fire management in the United States. John Wiley and Sons, New York.

Quarterman, E. and C. Keever. 1962. Southern mixed hardwood forest: climax in the southeastern coastal plain, U.S.A. Ecol. Monogr. 32:167-185.

Radford, A.E., H.E. Ahles, and C.R. Bell. 1968. Manual of the vascular flora of the Carolinas. The Univ. North Carolina Press, Chapel Hill.

Robbins, Louise E. and R.L. Myers. 1989. Seasonal effects of prescribed burning in Florida: A review. Prepared by The Nature Conservancy, Fire Mgt. and Rsch. Program, Tallahassee, for Florida Game and Fresh Water Fish Comm., Nongame Wild. Program.

Runkle, J.R. 1982. Patterns of disturbance in some old-growth mesic forests of eastern North America. Ecology 63:1533-1546.

Sargent, Charles S. 1884. Report on the forests of North America (exclusive of Mexico). US Dept. Int. Census Off. 10th Census Rept., vol. 9, Washington, D.C.

Sauer, Carl O. 1980. Seventeenth century North America. Turtle Island, Berkeley.

Schwarz, G. Frederick. 1907. The longleaf pine in virgin forest. John Wiley and Sons, New York.

Small, J.K. 1921. Old trails and new discoveries. J. New York Bot. Gard. 22:25-40.

Snead, J.L. and R.P. McCulloh, compilers. 1984. Geologic Map of Louisiana. Louisiana Geological Survey, Baton Rouge, LA. Scale 1:500,000.

Streng, D.R., J.S. Glitzenstein, and P.A. Harcombe. 1989. Woody seedling dynamics in an east Texas floodplain forest. Ecol. Monogr. 59:177-204.

USDA, Soil Conservation Service. 1989. Environmental impact statement update, soil survey of Fort Polk and Peason Ridge Military Use Area, Louisiana. USDA Soil Conservation Service, Alexandria, Louisiana. 125pp. +maps.

Vogl, R.J. 1973. Fire in southeastern grasslands. Proc. Ann. Tall Timbers Fire Ecology Conf., Tallahassee, FL. 12:175-198.

Vogl, R.J. 1974. Effects of fire in grasslands *in* J.T. Kozlowski and C.E. Ahlgren, editors. Fire and ecosystems. Academic Press, New York.

Wade, Dale, J. Ewel, and R. Hofstetter. 1980. Fire in south Florida ecosystems. USDA Forest Serv. General Tech. Rep. SE-17.

Wahlenberg, W.G. 1946. Longleaf pine: Its use, ecology, regeneration, protection, growth, and management. Charles Lathrop Pack Forestry Foundation, in coop. with USDA Forest Serv.

Waldrop, T.A., D.L. White, and S.M. Jones. 1992. Fire regimes for pine-grassland communities in the southeastern United States. For. Ecol. Manage. 47:195-210.

Welch, R.N. 1942. Geology of Vernon Parish. Department of Conservation, LA Geol. Surv., Geol. Bull. No. 22, Baton Rouge.

Williams, R. and L.M. Smith. 1995. A survey and description of the natural plant communities of Kisatchie National Forest, Caney District. Louisiana Dept. of Wildl. and Fish., Baton Rouge.

Williamson, G. Bruce and E.M. Black, 1981. High temperature of forest fires under pine as a selective advantage over oaks. Nature 293:643-644.

Winters, R.K., J.A. Putnam, and I.F. Eldredge. 1938. Forest resources of the north Louisiana delta. USDA Misc. Publ. 309.

Wise, E.W. 1988. Tall Pines II. A history of Vernon Parish Louisiana and its people. Erban W. Wise, Sulphur, LA.

APPENDIX A

Kisatchie National Forest Natural Community Survey
Community Occurrence/Stand Survey Summary

Date:
Surveyor:
District:
Compartment:
Stand:
Age:
Quads:
TRS:
Distance and Direction to Nearest Town:
Source of Lead (Aerial Photo, Prescription, USFS Employee, etc.):
Other:

Stand or Natural Community Description:
USFS Forest Type:
LNHP Community Type:
Community Physiognomy/General Description:

Acres:
Topographic Position or Features:
Slope percent/Aspect:
Moisture Regime:
Soil Name(s)/Type(s):
Geological Formation(s):

Is this Occurrence a Stand or Part of a Stand (If part of a stand, indicate extent on Quad):

Does this Community Occurrence Extend Beyond Designated Stand Boundary (If so, Indicate Full Extent on Quad, If Known):

Indicate the Area Surveyed on Quad:
Describe Character of Habitat Surrounding Stand:

Evidence of Unnatural Disturbance (e.g. past cutting, stumps, absence of fire, fire-break lines, old roads, ect.):

Fire Regime:
Estimated Frequency of Fire:
Estimated Time Since Last Fire:

Transect Reconnaissance- Select a representative area after generally surveying the occurrence

Forested Communities: In the table below, record the species and dbh class of each stem.

*OVERSTORY/MIDSTORY DBH CLASS DISTRIBUTION**
(inches)

SPECIES	2-5	>5-10	>10-15	>15-20	>20-25	>25-30	>30-35	>35

Transect Reconnaissance (continued) -
Forest/Non-forested Communities:

Lower Woodies/Herbs*

Forest - record data for every other 10m X 10m plot (5 total)

Non-Forest - 50m X 10m; record data for every 10m X 10m plot.

Note: Record data only for the five most abundant herbs and shrubs in each plot.
Cover classes: <5%, 5-10%, 10-25%, 25-50%, 50-75% and >75%.

*PERCENT WOODY COVER BY PLOT**

SPECIES (woody)	*PLOT 1*	*PLOT 2*	*PLOT 3*	*PLOT 4*	*PLOT 5*

*PERCENT HERBACEOUS COVER BY PLOT**

SPECIES (herbs)	*PLOT 1*	*PLOT 2*	*PLOT 3*	*PLOT 4*	*PLOT 5*

Notes on Transect Reconnaissance:

Briefly describe features of occurrence/stand not captured by this transect:

Describe any atypical features of variation within the transect:

Soils(type, color, texture):

General Reconnaissance -

Old Growth Characteristics:

Snags:
Canopy Gaps:
Rotting Logs:
Forest Uneven-aged:
Old Damaged Trees:
Old Vines:
Large Specimens of Understory Trees:
Average Height to Lowest Limb of Older Trees:
Other:

Sensitive/LNHP Species Present:

Species	*Estimated #*	*Estimated Areas*	*% In Flower*	*% In Fruit*

Exotics Present and Degree of Infestation:

Unique Physical Characteristics/Inclusions (e.g. waterfalls, rock ledges, barrens, exposed geological strata, etc.; Indicate location on quad):

Distinct Vegetation patches or Distribution Patterns Apparent (as affected by topography, soils, disturbances, other):

Other Comments :

Epilogue:
Presumed Pre-settlement Community Type/Potential Natural Vegetation (Give Reasoning):

Comparison of USFS Stand Description to Field Observations:

Potential for Recovery from Unnatural Disturbances:

Threats/Management Needs:

Does Stand Qualify for Quantitative Re-sampling?

Overall Natural Community:

A	[ ]
AB	[ ]
B	[ ]
BC	[ ]
C	[ ]

Justification:

APPENDIX B

Field Notes from the natural community survey of the Vernon District. Com = compartment, Std = stand, Type = USFS forest cover type code, Yr1 = year of stand origination (19..).

Com	Std	Type	Yr1	Age	Field Notes
1	2	2112	33	62	-high shrub density, good forest structure, good herb layer
1	26	3112	23	72	-baygall, open canopy
1	27	3112	23	72	-baygall, open canopy
1	32	2112	28	67	-high shrub density, large hardwoods and loblolly, poor herb layer
1	33	2112	28	67	-high shrub density, large hardwoods, poor herb layer
1	37	3110	30	65	-cleared
2	3	2101	19	76	-sampled
2	9	2112	10	85	-not on map, typed as 13-13 on Vernon map
2	16	2112	24	71	-not on map
2	25	2112	19	76	-typed as 62-11 on Vernon map, not on S.O. map
2	28	2112	29	66	-shrubby, large hardwoods, good forest structure, poor herb layer
2	29	9815	30	65	-open midstory, very little shrubs, good forest, good herb layer. Typed as 2112 on the Vernon map
2	30	2112	29	66	-nice, few shrubs, recently burned, good forest structure, good herb layer
2	31	3112	30	65	-nice, good forest structure, good herb layer, open midstory, low shrub growth
2	33	3112	19	76	-very nice on south side of road, very open midstory, excellent forest structure, good herb layer
3	1	2112	16	79	-impenetrable mess! bad forest structure, poor herb layer, dense tall hardwoods and shrubs
3	2	2112	16	79	-high density of tall shrubs, low fire frequency, poor herb layer, good forest structure, needs burning

3	6	1312	28	67 -some older loblolly pines, but very shrubby, immature stand. Typed as 1312 on Vernon map
3	8	4612	24	71 -possible stand to survey
3	9	4612	24	71 -open, baygall community, open canopy
3	11	1312	28	67 -open, baygall community, open canopy
3	17	1212	28	67 -typed as 3112 in S.O. data, open canopy community, baygall habitat
3	18	2112	24	71 -high shrub density, loblolly and slash pine juveniles present, not alot of regeneration, poor herb layer, low fire frequency
3	24	2112	28	67 -cleared, typed as 3112 on Vernon map
3	25	2106	16	79 -cleared, typed as 6212 on Vernon map
3	26	2112	24	71 -immature, open canopy forest with thick density of shrubs. Typed as 6212 on Vernon map
3	30	9806	16	79 -fairly high density of shrubs, somewhat open midstory, poor herb layer, good forest structure. Typed as 2112 on Vernon map
3	31	9806	30	65 -typed as 2112 on Vernon map. High density of tall shrubs, low fire frequency, poor herb layer, good forest structure
3	33	3112	30	65 -typed as 6212 on Vernon map. Baygall community, open canopy
4	8	2112	29	66 -shrubby, large hardwoods, good forest structure, nice old trees, poor herb layer, no regeneration of longleaf pine
4	10	2112	30	65 -high shrub density, tall hardwoods, poor herb layer, okay forest structure
4	11	2112	24	71 -shrubby, tall shrubs, high density of mixed loblolly and longleaf pines, good forest structure, poor herb layer
4	12	4612	35	60 -very young stand, somewhat open midstory, open canopy, bayhead community

4	13	4612	35	60 -old bayhead swamp with some large trees and fairly open midstory
4	16	2112	29	66 -somewhat shrubby, good forest structure, good herb layer, high diversity
4	20	2110	6	89 -high density of shrubs, isolated, poor herb layer, good forest structure with some older trees
4	21	2112	30	65 -somewhat shrubby, good forest structure, good herb layer, high diversity
4	22	2112	30	65 -dense shrub layer, isolated, poor herb layer, good forest structure, some older trees present
5	7	2112	34	61 -tall shrubs, high density of shrubs, large hardwoods, good forest structure, poor herb layer
5	8	4612	99	96 -partly thinned and planted into loblolly pines, some parts of stand need revisiting
5	10	2112	34	61 -tall shrubs, high shrub density, large hardwoods, good forest structure, poor herb layer
5	13	2112	34	61 -southern part of stand okay, good herb layer, good forest structure, but gets more shrubby near stands 10 and 7
5	14	2112	34	61 -shrubby, nice forest structure, poor herb layer, tall dense shrubs
5	15	3112	34	61 -open canopy forest, immature stand of loblolly pines, bad midstory and canopy layers
5	17	2112	34	61 -shrubby, nice forest structure, poor herb layer, tall dense shrubs
5	21	2112	24	71 -shrubby, poor herb layer, okay forest structure
5	23	2112	24	71 -good forest structure, okay herb layer, some disturbance
5	24	2112	24	71 -good forest structure, dense tall shrubs, okay herb layer
5	25	2112	24	71 -nice, open midstory, low shrubs, good fire frequency, nice forest structure, nice herb layer

5	32	2112	34	61 -tall, impenetrable shrubs, poor herb layer, good forest structure
5	33	1312	34	61 -dense midstory, open canopy
5	35	2112	24	71 -shrubby, dense shrubs, fairly good forest structure, good herb layer
6	1	2212	35	60 -slash pine stand, bad forest structure
6	2	2112	21	74 -shrubby, high disturbance, tall shrubs, tall hardwoods, good forest structure
6	3	2112	35	60 -somewhat shrubby, nice forest structure with older trees, good herb layer
6	6	2112	26	69 -high shrub density, high disturbance good forest structure, poor herb layer
6	11	2112	22	73 -shrubby, good forest structure, old trees present, no regeneration, poor herb layer
6	12	6211	28	67 -baygall community, open canopy
6	13	6211	28	67 -possible sample site near road, some older loblolly pines mixed in baygall area
6	14	2212	35	60 -slash pine stand
6	15	2212	28	67 -slash pine stand
6	16	2212	35	60 -slash pine stand
6	18	2112	35	60 -young forest, juveniles and grass stage present, good herb layer, shrubby
6	20	2112	21	74 -two different stand mapped as stand number 20. Both are shrubby, with poor herb layer, and tall hardwoods, bad forest structure
6	21	2212	35	60 -slash pine stand
6	23	2212	35	60 -slash pine stand
6	24	2212	35	60 -slash pine stand
6	26	2112	35	60 -good forest structure, good herb layer, open midstory, possible sample site
6	27	2106	28	67 -sampled
6	29	2112	35	60 -shrubby, good forest structure, poor herb layer
6	30	2212	35	60 -slash pine stand
6	31	2212	35	60 -slash pine stand

6	32	2112	35	60 -shrubby, high density of shrubs, impenetrable, poor herb layer, good forest structure
6	34	2112	21	74 -shrubby, high density of tall shrubs, good forest structure, poor herb layer
6	36	2212	35	60 -slash pine stand
6	37	2112	35	60 -shrubby, high density of tall shrubs, good forest structure, poor herb layer
6	38	2112	35	60 -shrubby, good forest structure, poor herb layer
6	39	2112	35	60 -shrubby, good forest structure, poor herb layer
6	41	2212	35	60 -slash pine stand
9	10	2112	12	83 -poor stand, high shrub density, tall shrubs, good forest structure, poor herb layer
9	11	2112	27	68 -poor stand, high shrub density, tall shrubs, good forest structure, poor herb layer
9	13	4612	99	96 -baygall community, open canopy bay swamp, thick midstory
9	18	2112	21	74 -high shrub density, poor herb layer, bad forest structure, not alot of regeneration
9	26	2112	27	68 -poor stand, high shrub density, tall shrubs, good forest structure, poor herb layer
10	9	2110	3	92 -poor herb layer, high density of shrubs, tall hardwoods, isolated, good forest structure
10	20	2112	26	69 -good forest structure, good herb layer
10	21	3112	34	61 -sampled
10	26	2110	5	90 -disturbed site, poor herb layer, good forest structure, low shrubs
10	31	2112	20	75 -small shrubs, disturbed herb layer, good forest structure
10	33	2112	26	69 -sampled
10	35	2110	4	91 -nice area, good forest structure, good herb layer, low shrubs
10	40	2110	0	95 -shrubby area, disturbed herb layer, good forest structure
10	41	5312	20	75 -sampled

10	45	2110	0	95 -disturbed herb layer, good forest structure, poor herb layer, low shrubs
10	48	2110	5	90 -sampled
10	49	2112	30	65 -nice area, good forest structure, good herb layer, low shrubs
10	50	2112	30	65 -sampled
10	51	2112	30	65 -recently burned, good herb layer, low shrubs, good forest structure
10	52	2112	30	65 -shrubby, good forest structure, poor herb layer
10	53	2112	30	65 -recently burned, good herb layer, low shrubs, good forest structure
10	54	2110	30	65 -disturbed herb layer, good forest structure, poor herb layer
10	55	2112	30	65 -good forest structure, good herb layer, some shrubs present
10	56	2112	26	69 -somewhat disturbed herb layer, good forest structure, good herb layer
10	58	2112	3	92 -poor herb layer, high shrub density, good forest structure
11	1	2112	29	66 -high shrub density, good forest structure, poor herb layer
11	5	1312	13	82 -sampled
11	10	3112	34	61 -not on map
11	13	3112	33	62 -young loblolly pine stand, thick dense shrubs, open canopy forest
11	14	6212	33	62 -mature baygall area, closed canopy, small trees present
11	17	3112	33	62 -high shrub density, open canopy, immature forest
11	20	2112	34	61 -highly disturbed site, low fire frequency, high shrub density, large hardwoods, poor herb layer, bad forest structure
11	24	3112	34	61 -few older trees, thick midstory, open canopy, small stand size
11	25	2106	34	61 -highly disturbed site, poor herb layer, not much regeneration, some shrubs
11	27	2112	29	66 -high shrub density, good forest structure, poor herb layer
11	28	2112	29	66 -highly disturbed site, not much regeneration, poor herb layer, some shrubs

11	30	2112	30	65 -high shrub density, good forest structure, poor herb layer
11	31	2112	30	65 -small isolated area, low fire frequency, dense tall shrubs
11	33	6212	13	82 -thinned and cleared, very open canopy, small loblolly pines and hardwoods emerging
11	34	2112	29	66 -high shrub density, good forest structure, poor herb layer
13	10	4712	5	90 -sampled
13	11	5312	5	90 -sampled
13	12	3110	30	65 -thinned and open canopy
13	16	5312	5	90 -thinned and open canopy
13	17	2112	32	63 -high frequency of shrubs and tall hardwoods, poor herb layer, good forest structure
13	19	2112	32	63 -high shrub density, good forest structure, poor herb layer
13	24	2112	30	65 -high shrub density, tall shrubs and hardwoods, poor herb layer, nice older trees, little regeneration
13	29	3112	29	66 -isolated, thick midstory and open canopy forest
13	31	3110	30	65 -thinned and open canopy forest
14	3	2112	29	66 -sampled
14	5	2112	29	66 -high shrub density, good forest structure, poor herb layer
14	7	1312	29	66 -mature bayhead swamp, no open midstory with some older trees, no loblolly pines
14	13	2112	29	66 -shrubby areas, high shrub density, some older trees, diverse herb layer, good forest structure
14	14	2112	29	66 -high shrub density, good forest structure, poor herb layer
14	18	3112	29	66 -high shrub density, tall hardwoods, poor herb layer, bad forest structure, isolated and small
14	24	2112	35	60 -high shrub density, good forest structure, poor herb layer
14	28	2112	29	66 -shrubby, dense tall shrubs, tall hardwoods, good forest structure, poor herb layer

14	29	2112	29	66 -nice, open midstory, diverse herb layer, good forest structure
14	30	2111	29	66 -very shrubby, young dense stand of trees, poor herb layer
15	3	3112	34	61 -immature and mature bayhead swamp, some closed canopy, mostly open canopy, thick midstory
15	5	2112	34	61 -slightly shrubby, good forest structure, diverse herb layer
15	8	2112	24	71 -sampled
15	9	3110	26	69 -shrubby, poor herb layer, good forest structure
15	16	3110	17	78 -immature or thinned stand, some large pines, open canopy, thick midstory
15	19	2112	26	69 -sampled
15	22	2112	24	71 -slightly shrubby and disturbed site, good forest structure, diverse herb layer
15	28	2112	34	61 -sampled
15	29	2112	26	69 -shrubby, fire suppressed, bad forest structure, poor herb layer
15	30	2112	30	65 -slightly shrubby, good forest structure, nice older trees, diverse herb layer
15	31	2112	30	65 -slightly shrubby, diverse herb layer, good forest structure
15	32	2112	34	61 -slightly shrubby and disturbed, good forest structure, diverse herb layer
15	33	2112	34	61 -shrubby with tall hardwoods and loblolly pines, diverse herb layer, bad forest structure
15	34	2112	34	61 -slightly shrubby, diverse herb layer, good forest structure
15	35	2112	24	71 -thick shrub layer, poor herb layer, no regeneration, bad forest structure
15	36	2112	24	71 -heavy shrub density, little regeneration, bad forest structure, diverse herb layer
15	37	6812	24	71 -mature bayhead swamp, open canopy, some large trees present, shrubby

15	38	2110	24	71 -highly disturbed herb layer, shrubby, tall hardwoods, good forest structure
16	3	2112	33	62 -somewhat shrubby, diverse herb layer, good forest structure
16	4	2112	33	62 -dense forest, many young with few older trees, diverse herb layer, some shrubs
16	5	2112	33	62 -dense forest, many young with some older trees, diverse herb layer, some shrubs
16	10	6212	33	62 -immature and thinned loblolly pine-mixed hardwood forest, open canopy, thick dense midstory
16	12	6811	33	62 -bayhead swamp, dense midstory, open canopy, some large trees present
16	16	2112	23	72 -sampled
16	17	2112	33	62 -sampled
16	18	2112	23	72 -somewhat shrubby, diverse herb layer, good forest structure
16	19	2112	33	62 -sampled
16	20	2112	23	72 -somewhat shrubby, dense forest of many young and some few older trees, diverse herb layer
16	21	2112	33	62 -high density of shrubs, recently burned, diverse herb layer, good forest structure
16	22	2112	23	72 -high shrub density, poor herb layer, bad forest structure
16	24	2112	23	72 -not on map
17	2	6112	10	85 -open, thinned canopy, thick midstory
17	5	2112	29	66 -shrubby, little regeneration, bad forest structure, high shrub density, poor herb layer
17	7	3112	29	66 -thick midstory, high shrub density, many young trees
17	8	2112	29	66 -shrubby, poor herb layer, little regeneration, poor herb layer
17	9	1312	29	66 -bad forest structure, high shrub density, open canopy, poor herb layer
17	10	2112	29	66 -sampled

17	11	2112	29	66 -fairly open midstory, some dense shrub areas, poor herb layer, good forest structure
17	14	2112	29	66 -high shrub density, good forest structure, poor herb layer
17	15	2106	29	66 -very young regeneration, high shrub density, poor herb layer
17	16	2106	29	66 -high shrub density, good forest structure, poor herb layer
17	17	2112	29	66 -fairly open midstory, some dense shrubs, poor herb layer, good forest structure
17	18	2112	29	66 -sampled
17	19	2112	29	66 -shrubby, poor herb layer, bad forest structure, little regeneration
17	21	6812	29	66 -open canopy bayhead swamp, thick midstory
17	22	2112	29	66 -little regeneration, shrubby in parts, many young trees, poor herb layer, bad forest structure
18	6	6212	26	69 -parts of this stand have been cleared and thinned, some older trees remain, open canopy
18	7	6212	29	66 -small trees, many young trees, cleared in part, open canopy
18	8	5312	33	62 -sampled
18	11	6212	29	66 -sampled
18	15	3110	25	70 -immature, thinned loblolly pine-hardwood stand, no closed canopy, high shrub density, poor herb layer
18	18	3110	29	66 -thinned stand, open canopy, thick midstory
18	19	4612	3	98 -nice beech-white oak example, sampled
18	21	4612	15	80 -shrubby, dense midstory with open canopy
18	22	3110	35	60 -thinned stand, open canopy, thick midstory
18	23	3110	34	61 -thinned and cleared, open canopy, no midstory
18	26	6212	25	70 -immature bayhead swamp, very small and isolated stand, thick midstory, open canopy

18	27	6212	29	66 -thinned and shrubby, thick midstory
18	29	3110	29	66 -thinned and cleared, no midstory
19	1	2112	25	70 -thick and dense shrub layer, impenetrable shrubs, poor herb layer, bad forest structure
19	3	2112	25	70 -high shrub density, good forest structure, poor herb layer
19	4	2110	10	85 -high shrub density, tall blackjack oaks, good forest structure, poor herb layer
19	5	1310	20	75 -some old trees but mostly young loblolly pines, mixed hardwoods, little midstory
19	6	3112	20	75 -loblolly plantation, high shrub density, poor herb layer
19	11	2112	23	72 -high shrub density, tall blackjack oaks, good forest structure, poor herb layer
19	12	2112	23	72 -high shrub density, good forest structure, poor herb layer
19	15	3112	25	70 -cleared, no canopy, no midstory
19	17	3110	25	70 -cleared, no canopy, no midstory
20	3	3112	32	63 -young loblollys, open canopy, thick midstory, loblolly pine plantation
20	16	6212	21	74 -thinned, open canopy, thick midstory
20	17	1310	21	74 -thinned, open canopy, somewhat thick midstory
20	18	5312	21	74 -thinned, open canopy, thick midstory
20	21	3112	30	65 -open canopy, thick midstory, some larger trees, but mostly young trees, plantation
20	22	6212	21	74 -sampled
20	23	1310	21	74 -good forest structure, good riparian forest, old trees, open midstory
20	24	1310	21	74 -older loblolly pine plantation
20	27	2112	20	75 -high shrub density, young trees
20	28	2112	20	75 -large hardwood component, sweetgums greater than 3m tall, high shrub density, bad forest structure, poor herb layer

20	29	2112	20	75 -large hardwood component, high shrub density,poor herb layer, bad forest structure
20	38	2112	20	75 -high shrub density, many young trees, few older trees, no regeneration, bad forest structure, poor herb layer
20	40	2112	20	75 -good forest structure, diverse herb layer, frequent burns,open midstory
20	41	2112	20	75 -open midstory, good forest structure, diverse herb layer
20	55	5312	32	63 -open midstory, some older trees, fairly closed canopy
21	12	6212	1	94 -immature or thinned stand, dense midstory, open canopy
21	22	1310	1	94 -mostly immature stand with an open canopy and thick midstory
21	23	1310	1	94 -thick midstory, open canopy, thinned
22	7	2112	27	68 -high shrub density, large hardwoods, good forest structure, poor herb layer
22	16	2112	28	67 -shrubby, slash pine regeneration present, no longleaf pine regeneration, poor herb layer, bad forest structure
22	17	2112	28	67 -shrubby, slash pine present, bad forest structure, poor herb layer
22	19	2112	28	67 -shrubby, slash pine present,bad forest structure, poor herb layer,
22	47	2112	27	68 -high shrub density, poor herb layer, large hardwoods, good forest structure
23	5	2212	34	61 -slash pine plantation
23	6	2212	34	61 -slash pine plantation
23	7	2212	34	61 -slash pine plantation
23	8	2212	34	61 -slash pine plantation
23	9	2212	34	61 -slash pine plantation
23	20	2212	32	63 -slash pine plantation
23	21	2112	35	60 -isolated small stand, low fire frequency, poor herb layer, thick shrub layer, good forest structure
23	22	2112	35	60 -sampled

23	23	3112	30	65 -thick midstory, loblolly pine stand, small isolated, open canopy,good forest structure
23	25	2112	30	65 -sampled
23	26	2112	30	65 -somewhat shrubby, disturbed herb layer (cows?), large hardwoods, bad forest structure, poor herb layer
23	42	2212	34	61 -slash pine plantation
24	4	6810	15	80 -immature bayhead swamp, open canopy,thick midstory
24	6	4612	34	61 -immature forest, some large oaks but open canopy and thick midstory present
24	14	2112	33	62 -sampled
24	20	2112	20	75 -recently burned, diverse herb layer, good forest structure
24	24	2112	20	75 -little regeneration, good forest structure, diverse herb layer, open midstory, little shrubs
24	26	2112	20	75 -sampled
24	27	2112	0	95 -little shrubs, good forest structure, diverse herb layer, open midstory
24	31	2112	20	75 -dense with shrubs, poor herb layer, good forest structure
24	32	2112	20	75 -shrubby, good forest structure, diverse herb layer
24	42	2112	33	62 -sampled
24	43	2112	33	62 -nice, good forest structure, open midstory, diverse herb layer
24	44	2112	33	62 -nice, diverse herb layer, frequent fire, open midstory, good forest structure
24	45	2112	33	62 -sampled
24	47	2112	33	62 -nice, good forest structure, diverse herb layer, open midstory
24	49	2112	33	62 -nice, good forest structure, diverse herb layer, open midstory
24	50	2112	33	62 -shrubby, high shrub density, high disturbance impact on the herb layer, poor herb layer, bad forest structure
24	51	2112	33	62 -shrubby, poor herb layer, good forest structure

24	52	2112	33	62 -shrubby, poor herb layer, good forest structure
24	53	2112	33	62 -high shrub density, poor herb layer, good forest structure
24	56	2112	30	65 -high shrub density, good forest structure, poor herb layer
24	57	2112	33	62 -sampled
24	58	2112	33	62 -sampled
24	59	2112	33	62 -shrubby, poor herb layer, bad forest structure, no longleaf pine regeneration
24	60	2112	33	62 -shrubby, poor herb layer, bad forest structure
25	5	2112	19	76 -good forest structure, recently burned, diverse herb layer
25	6	2112	17	78 -good forest structure, recently burned, dense trees, open midstory
25	10	2112	20	75 -sampled
25	11	2112	20	75 -good forest structure, recently burned, dense trees, open midstory
25	12	2112	30	65 -sampled
25	13	2112	30	65 -recently burned, dense trees, diverse herb layer, good forest structure
26	7	4412	23	72 -sampled
26	8	6812	23	72 -immature stand, open canopy, thick midstory
26	9	4412	23	72 -open canopy, thick midstory
26	25	1312	35	60 -campground
26	26	2112	20	75 -sampled
26	27	2112	20	75 -nice forest structure, great herb layer, open midstory, nice
26	28	2112	20	75 -shrubby, very poor herb layer, good forest structure
26	30	2112	24	71 -open midstory, somewhat shrubby, diverse herb layer, good forest structure
26	33	2112	35	60 -high shrub density, poor herb layer, good forest structure
26	34	2112	35	60 -open midstory, diverse herb layer, good forest structure
26	35	2112	35	60 -high shrub density, poor herb layer, good forest structure

26	36	2112	35	60 -somewhat shrubby, diverse herb layer, good forest structure
27	9	5311	35	60 -some older trees, thick midstory, open canopy
27	14	5312	35	60 -some older trees, thick midstory, open canopy
27	19	3110	10	85 -older trees present, isolated area, open midstory, low diversity of species in herbaceous layer
27	20	3110	10	85 -young trees, open canopy, shrubby
28	2	4612	30	65 -immature stand, open canopy, some larger loblolly pines, mostly thick shrubs and small trees
28	3	2112	34	61 -shrubby, good forest structure, poor herb layer, thick midstory
28	4	2212	34	61 -slash pine plantation
28	12	2110	35	60 -sampled
28	13	2212	35	60 -slash pine plantation
28	14	2110	35	60 -shrubby, some old trees, good forest structure, diverse herb layer
28	15	2110	35	60 -seed tree area, shrubby, bad forest structure, diverse herb layer
28	16	2112	34	61 -seed tree area, open midstory, diverse herb layer, bad forest structure
28	18	2112	34	61 -shrubby, poor herb layer, good forest structure
28	19	2112	34	61 -sampled
28	20	2112	34	61 -dense young trees, good forest structure, diverse herb layer, open midstory
28	21	4612	30	65 -immature stand, open canopy, large loblolly pines present, mostly thick midstory
28	23	2112	34	61 -high shrub density, low fire frequency, poor herb layer, bad forest structure
28	25	2112	34	61 -small young trees, diverse herb layer, bad forest structure, no old trees
28	26	2112	34	61 -high shrub density, poor herb layer, bad forest structure

28	27	2112	34	61 -recently burned, diverse herb layer, young trees, open midstory
28	28	2112	34	61 -sampled
29	17	2112	30	65 -sampled
30	3	2112	29	66 -sampled
30	11	6812	2	93 -bayhead swamp area, this area has been highly disturbed from development of the town of Fullerton, open canopy, thick midstory
30	14	6812	29	66 -bayhead swamp area, open canopy, thick shrubs and small trees
30	16	2112	29	66 -recently burned, diverse herb layer, bad forest structure, open midstory
30	23	2112	29	66 -poor herb layer, young trees in high density, bad forest structure, thick midstory of shrubs
30	24	2112	29	66 -sampled
30	28	2112	29	66 -sampled
30	29	2112	29	66 -high shrub density, poor herb layer, good forest structure
30	30	2112	29	66 -high shrub density, good forest structure, diverse herb layer
30	31	2112	29	66 -shrubby, young trees in high density, diverse herb layer, good forest structure, some regeneration
30	32	2112	29	66 -high shrub density, poor herb layer, good forest structure
30	33	2112	29	66 -shrubby area, poor herb layer, young trees, bad forest structure
30	34	2112	29	66 -shrubby, good forest structure, poor herb layer
30	35	2112	29	66 -not on map
31	11	2110	0	95 -sampled
31	17	3110	24	71 -open canopy, thick midstory, old railroad grade and other disturbances present
31	23	5310	24	71 -bayhead swamp area, open canopy, thick midstory, high soil disturbance
32	19	2112	0	95 -sampled

32	23	2110	0	95 -high shrub density, large hardwoods, good forest structure, poor herb layer
32	24	2108	0	95 -cooter's bog, off limits
32	30	2112	35	60 -sampled
32	31	2112	35	60 -nice area, burned recently, open midstory, great herb layer, good forest structure
32	32	2112	35	60 -high shrub density, large hardwoods, good forest structure, poor herb layer
33	6	5311	32	63 -on northern boundary, bayhead swamp with associated bogs, a very immature riparian forest found at the southern end with open canopy and thick shrub